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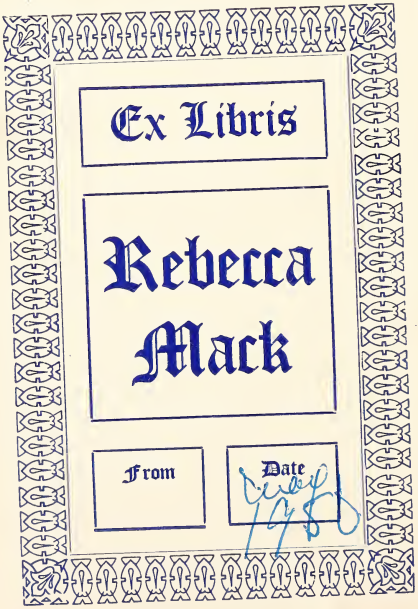

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# THE WORLD OF THE BLIND

(A PSYCHOLOGICAL STUDY)

BY

PIERRE VILLEY

PROFESSOR OF LITERATURE OF CAEN UNIVERSITY

(AWARDED A PRIZE BY THE FRENCH ACADEMY OF MORAL SCIENCE)

TRANSLATED BY

ALYS HALLARD

DUCKWORTH
3 HENRIETTA STREET, LONDON, W.C.
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DEDICATED TO THE MEMORY
OF SIR ARTHUR PEARSON
BY
PIERRE VILLEY

# RESUMÉ OF REPORT READ TO THE FRENCH ACADEMY OF MORAL AND POLITICAL SCIENCE

BY

DR PIERRE JANET

*We have been asked to designate, for a prize of five thousand francs, the author of the best work of recent years on the subject of the psychology of the blind. Our Section of Philosophy could not do otherwise than present the name of Pierre Villey, Professor of Literature of the Caen Faculty of Letters. His book:* The World of the Blind, *is a fine work, which has certainly revived and transformed the psychological study of the blind.* . . . . . .

*M. Villey has been blind from his earliest childhood, but this fact has not prevented him from pursuing his studies at the Higher Normal College and from passing all his examinations. The subject he chose for his thesis for the Sorbonne was* Montaigne, *and it certainly is a remarkable work of erudition in itself and seems almost like a challenge from a blind man. M. Villey has studied the literary and scientific works of a great number of blind men and women and the idea which inspired his book:* The World of the Blind, *is to prove that, contrary to the opinion so widely spread, the blind man's intellect, intelligence and personality do not differ from the intellect, intelligence and personality of the man who has his eyesight.*

*There are, in my opinion, two chapters in this book, particularly profound which, whilst treating of the psychology of the blind, go beyond it and are a remarkable contribution to psychology in general. The question treated in these two chapters is whether the space of the blind man is the same as that of the man who sees..... In this study M. Villey furnishes, on several points, experiences which are particularly decisive.*

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# PREFACE

I have had the opportunity of making a great number of observations, both with regard to myself and many other blind men. A vast amount of information concerning the psychology of the blind is hidden away in their special publications. It occurred to me that it might be interesting to the public, and also to psychologists, to unearth and publish in collective form a number of these documents.

This idea alone, however, would not have sufficed for inducing me to undertake this task. I am surprised myself to think that I am signing my name as the author of a book on such a subject. Ten years ago I certainly would not have written it, for the blind man feels an invincible dislike to talking to others about his infirmity. A sense of duty has made me conquer this feeling. The blind are victims of the ignorance of the public concerning their real condition. By explaining something of their psychology, I am helping to defend them against the prejudices which are the chief barrier to their professional activity.

The reader need not fear that these two objects of my book will interfere with each other, or that any apologetic desire has influenced my observations. I hope that the scrupulous way in which I have endeavoured to mark the limits of what the blind man can do, although it may draw down on me the

reproaches of the interested parties, will prove to be the merit of this little volume. My absolute conviction is that the truth only can serve efficaciously the cause I am defending.

I have given ample space in my book to the erroneous opinions afloat with regard to blindness. They are mentioned, nevertheless, because although they are wrong they are instructive for the psychologist, inasmuch as they represent the idea of blindness which germinates spontaneously in the brain of the man who can see, and they are mentioned, too, because they are amongst the most painful realities with which the blind man has to contend.

Several times also, in my volume, I speak of the blind and deaf. My idea was not to study their psychology (and many interesting problems concerning them have perhaps been left in the shade,) but it seemed to me that when trying to explain the sentiments of those deprived of one sense, it was instructive to confront them with those deprived of two senses, as well as with normal individuals. In nearly every chapter, the deaf-blind offer us a comparison extremely instructive.

I must ask my readers to consider this little work as the result of collaboration. Many blind men have contributed to it, though frequently unconsciously. Herr Papendieck, President of the *Verein der deutsch-redenden Blinden*; Mr. Stainsby, Secretary of the *British and Foreign Blind Association*, of London, M. Siddal, a former pupil of Worcester College; M. Pietro Landriani, President of the *Société Margareta*, of Florence, have very kindly helped me with my documentation in their respective countries. I am still more deeply indebted to M. Maurice de la Sizeranne, who placed most freely at my disposal all the resources of the *Association*

*Valentin Haüy*, as well as his own. He saw in my book a champion of the cause to which he has given his life. It can readily be imagined, therefore, the interest he has taken in it.

*The Association Valentin Haüy for the Welfare of the Blind*, which he founded and which has its headquarters at 9, Rue Duroc, Paris, places at the disposal of everyone the fullest information concerning the psychology of the blind, and all that pertains to the life of the blind.

Part I. The Intelligence of the Blind 13

Part II. The Substitution of Lenses and the Activity of the Blind 71

Part III. The Substitution of Images and the Furniture of the Mind 179

Part IV. Indications with Regard to the Affective Life 263

Part V. Psychology of the Blind in Society 357

*A more detailed list of Contents is given on pp* 397-403

their special schools, their libraries, their newspapers, their Associations. What one of them discovers for the improvement of his own particular welfare is communicated to them all. A close solidarity enables them to improve, progressively, their methods of culture and their means of action.

Their life has thus been completely transformed. Formerly, only those blind men specially favoured by circumstances could manage, by prodigious efforts, to develop their faculties. All of them, at present, can find the surroundings necessary for the development of their individuality. All of them, at least in principle, are enabled to receive a culture adapted to their needs and to lead a useful existence. But in spite of this transformation, the prejudice against blindness still exists and will only disappear slowly.

In nearly all minds, the word *blind* evokes the same pitiful and wrong image. Behind those sightless eyes and that face without animation, the first idea is to suppose that everything is dulled, the intelligence, the will, the sensations, and that the faculties of the very soul are numbed and, as it were, stupefied. And then, accustomed as those who see are to do nothing without using their eyes, it seems to them, very naturally, that if they lost their eyesight, they would be incapable of any activity, and that their very thoughts would cease to flow through their mind.

They cannot easily imagine that the blind, deprived of the resources of the eyesight, find, in exchange, resources in other senses which are neglected by most men to whom Nature has been bountiful, but which are most valuable to those who know how to use them and make them fructify. Those who see are not aware, or they have forgotten, that certain benevolent persons have invented special means and

methods which enable the blind to bridge over the great gulf which their blindness had hollowed out between them and other men. To the general public, the blind man is a strange being, living outside the common life. When one meets with a clever or specially distinguished blind man, this idea changes for a brief time, but very soon it returns and triumphs once more over any contrary experiences. One has to be a long time with the blind in order to get rid of the idea altogether, and some persons never do get rid of it.

What makes the struggle against this psychological error so difficult is that it has its foundation in the inner consciousness. The man who sees judges the blind, not by what they are, but by the fear with which blindness inspires him. If his wrong idea of blindness rested chiefly on experience wrongly interpreted, if it came, for instance, from the sight of so many blind beggars at the church doors, other experiences, in opposition to these, would correct the effect. But stronger than all the observations from outside, is the revolt of all one's sensitiveness in face of « the most atrocious of infirmities. » It is this that gives to the man who sees his prejudices and it is this which gives rise to a hundred legends. The man who sees imagines himself struck suddenly blind. As the blind man's means of action are very different from his own, he feels all that he would lose and not what he would gain. A gulf seems to open in front of him. All his activity and his very thought, organised around visual impressions, leave him whilst all his faculties seem to be wrapped round in darkness nailing him to the spot. It seems to him that the blind man remains crushed under the burden that is overwhelming him, that the very sources of his individuality are poisoned. This is,

I know, an impression rather than the judgment of the man who sees, but our impressions weigh, in our conduct, more than our judgment.

As this impression comes from the psychological differences which separate the blind man from the man who sees, from the fact that sight is to the latter the basis of his life, so that he feels that his whole life must founder if he should become blind, and he has no idea of the way in which he could rebuild that life on a new basis, the best way of fighting against this impression is to examine, with precision, the psychology of the blind, and to invite the man who sees to picture to himself the resources which he possesses.

Before anything else, it is necessary to establish the fundamental truth that blindness does not affect the individuality, but leaves it intact. Its sources remain healthy; no mental faculty of the blind is affected in any way, and all of them, under favourable circumstances, are susceptible of blossoming out to the highest degree of development to which a normal being can aspire.

Physically, the blind man knows that he cannot have the same liberty of action as the man who sees. He need not be completely dependent on the man who sees, but that is all. But with regard to all that is intellectual and moral, he has great pretensions, for he declares himself to be the equal there of other men.

Now that the blind, working together in schools, can easily be observed, and now that a rational culture, if it has not yet produced all the effects desired, shows at least to psychologists what can be expected from their faculties, it is easy not to fall into Diderot's errors. Even Valentin Haüy, with all his generous ambitions, did not dare hope so much from the future. In 1786, he wrote to the

King as follows: « We do not claim that even the most skilful of our blind men can ever compete, in any way whatever, with the most ordinary artists or savants who can see. »

In spite of experience which has answered peremptorily this essential point, even though some questions of detail still remain obscure, public opinion has scarcely gone beyond Valentin Haüy's point of view. Psychologists and typologists, at least cannot still hold to this..

2

On reflection, it is very evident that the eyesight is not necessary for the perfect function of thought. If the accident which has destroyed it be confined to the eye itself and its immediate surroundings, and has not touched the brain, the integrity of the intelligence is safe. In a man's mind there are very few notions that a blind man (a man born blind) cannot acquire, because there are very few which come to us uniquely by means of the eyes.

Analyse the elements of a visual sensation; you will find that nearly all of them are to be found in the tactile sensation. You look at a ruler lying on a table. Its colour is the first thing that strikes you. That is a sensation which the man born blind will not have. It is all in vain that he touches the ruler and turns it over. His fingers will never tell him that it is black. But as regards everything else: the length, width, height, shape of the ends, rigidity of the corners and polish of its surface, the place it takes up on your table, the distance between it and you, all these notions are given to him by means of his hand which explores. All are in reality merely the elementary notions of space, extent and solidity

which the touch furnishes quite as well, and even more exactly than the eye.

There are, of course, objects that are too far away from us and too immense for us to be able to touch them with our hands; but all the notions that the sight gives with regard to these objects apply to those that we have just indicated; all then, with the exception of the notion of colour, are conceivable to the individual who has the sense of touch. By multiplying and composing the notions of space and extent given by the touch, the idea of this or that object can be constructed and an exact image of it obtained. Sight is a long distance touch, with the sensation of colour added. Touch is near sight minus the sensation of colour, and with the sensation of rugosity added. The two senses give us knowledge of the same order.

Those who can see do not see the whole earth at a glance; they get an idea of it, though, from the indications given them by the geometricians. In the same way, with regard to objects which they cannot touch, the blind can get ideas from the reports furnished by those who can see, as these can always be translated into tactile language.

Those who are born blind, then, are deprived of the notion of colour. This is an elementary notion, which no other sense can give, which no language can explain and which no analogy can help those who have not seen to perceive. To this I add the notion of light, as the same remarks apply. These notions are, however, of very little importance from an intellectual point of view. They only concern the superficial part of objects; they do not enter in any way into the constitution of ideas essential to human thought, such as the ideas of space, time, cause, etc.

The blind are deprived of those impressions of pleasure, or of pain, caused by certain relations between forms and colours seen by the eye. The blind man does not have the sensation of visual beauty. And I must acknowledge that what he misses in this respect is very considerable. There are certain strong emotions which he will never know. But his loss is not really an intellectual loss. These relations do not result in any clear and distinct idea, they only awaken subjective impressions. When we speak of the blind artist, we must mention this important thing which is lacking. In studying his intelligence though, this does not matter much. To light, colour and physical beauty, I must add perspective. For the notion of the latter, one is dependent on the eysesight and I have never yet met with a person born blind who had a clear idea of this. It is only for those who are either born blind, or who become blind at a very early age, that all these notions are lacking. We have only to wait a few years and the blind will have acquired all these notions, and their memory will retain them to the end of their lives in the midst of their darkness.

## 3

Granted then that nearly all ideas can be grasped by the brain of a blind man, it will be urged that, although it is not impossible for the blind to conceive these ideas, it is extremely difficult for him to acquire them. The obstacle is not in the nature of the ideas, but in the penury of the means at the disposal of the blind for assimilating these ideas. The man who can see has generally obtained them thanks

to his eyesight, and there is no route which leads more rapidly and with more precision to the mind. It would seem then that the furniture of the intelligence must always remain rudimentary for the blind.

This is the chief objection, and it is always this that one finds at the base of all the astonishing things of which we have spoken.

To all those who express this to me, I invariably put the question : Do you know Helen Keller ?

Helen Keller is a young American woman who, at the age of eighteen months, after a serious illness, became blind and deaf and, in consequence of her deafness, dumb. It seemed, then, as though her little mind were doomed to be completely closed to all outside impressions. Her intellectual acquirements must surely be limited to a few rare ideas, the ideas of the objects which she could touch with her hands. It even seemed doubtful whether, in the midst of the dense darkness in which she lived, she could ever have any distinct idea about these objects. At present, Helen Keller, although still blind and still deaf, is, at the age of thirty-eight, a very distinguished and well-educated person who has attended University lectures, passed her examinations brilliantly and who speaks several languages.

It sufficed to make certain signs on her hands whilst she touched objects, for her to understand, at the end of twenty days, that each idea was represented by a special sign and that, thanks to this convention, people could communicate their thoughts to each other. Six weeks later, she recognised, by touch, the letters of the Braille alphabet. After another month she wrote a letter to one of her cousins. and at the end of three years she had acquired a sufficient quantity of ideas, and of words, to enable

her to converse freely, to read intelligently and to write in good English. The next experiment was to let her touch the movements of the pharynx, the lips and the tongue, which accompany human speech. By imitating these movements, she then reproduced the sounds articulated in her presence.

A month sufficed for her to learn to speak English correctly and then, by merely placing her hand on the lips of the person talking to her, she began to read, with her fingers, the words they emitted. In this way, by means of touch alone, Helen Keller made for herself three openings to the outer world, three roads by which ideas from outside could be brought to her: the manual alphabet, reading in relief, and human speech. Thanks to these three means of acquisition, she was able to take her place in that intellectual aristocracy formed by very cultivated people, of whom there are so few. Finally, not content with speaking her own language, she studied German, in order to have access, more easily, to the important works of German literature.

She then learnt French, which she writes correctly, Latin and as much Greek as her University examinations made necessary.

Besides her *Autobiography*, she has writen various books which have been translated into all languages and have, consequently, made the tour of the world. Helen Keller's mental life is an extremely active one. A certain time each day is given to meditation and to reading, which she loves above everything else. Then she has a few intimate friends and an extensive correspondence. All this, together with the necessary work for her literary compositions, makes her life so full that she has no time for idling and no time to get bored.

There have been plenty of sceptics, who have

declared that Helen Keller's case is merely a romance, the masterpiece of American bluff. They have endeavoured to show, with a whole collection of proofs, that a deaf-blind person, suddenly struck with this double infirmity before she was two years old, could only constitute for herself a very poor stock of ideas, and that these would not suffice for alimenting a normal mind, sensibility or will. That is all very well, but facts are stronger than arguments, and Helen Keller exists. She does not live in an inaccessible place, but in one of the most inhabited parts of the globe, just near Boston. It is quite easy to go there, to see her and to talk with her. Many savants, and among others Professor Stern of Breslau, to whose account I shall refer later on, have been to visit her, in order to prove for themselves the truth of accounts which seemed to them fabulous. There are many witnesses to tell us about her past. The letters of her governess, which have been found and published, help us to follow, day by day, the development of her personality.

Her writings are in all hands: they cannot be done away with and replaced by arguments.

Helen Keller's development is not only an incontestable fact, but it is not an isolated fact. Helen Keller is more celebrated than others, and quite rightly, but she is not the only deaf-blind person who has been snatched from darkness. There are, at present, six schools devoted to the liberation of minds imprisoned in this way. The number of rescues, more or less complete, effected by them, has increased rapidly, since attention was called to such cases (1). Laura Bridgman, the first deaf-blind person

(1) It must be remarked that there are not very many of these unfortunates. Undoubtedly there are frequently cases of deaf-blindness, when one or both of these infirmities have come at a

to receive a methodical education; Richard Clinton, of the United States; Marthe Obrecht, in France; Inocencio Juncar y Reyes, of Spain, and many others have furnished psychologists of all countries with ample subjects for their edification. Eugenio Malossi, of Naples, a young man of keen intelligence, reads and writes French like Italian, his native language, and enjoys such intellectual activity as many persons with their eyesight might well envy. But Malossi was only encircled by this double darkness at the age of five, and Helen Keller when she was eighteen months old. It may be objected that both of them were seconded in their development by visual and auditive souvenirs of their earliest infancy. This is not at all likely in the case of Helen Keller, but it is probable as regards Malossi. Still more significative is the education of Marie Heurtin, which was commenced some twenty years ago at Notre-Dame-de-Larnay, near Poitiers.

Marie Heurtin was deaf and blind from birth. Light has nevertheless been brought, and with great success, to her intelligence. When Mlle Heurtin first came to the school, she used to roll on the ground and roar like a little animal. At present, she is about thirty, thoughtful, active, gay and of sound intelligence. Although she has only received an elementary intellectual education, it is evident that her faculties would have permitted her to have gone much farther in that direction. Her success is a proof of the psychological significance of the case of Helen Keller, and if we consider these two examples

relatively advanced age, but the psychological problem which we are studying is when both are from birth, or from earliest childhood. At present, only eight cases are known to exist of persons blind and deaf from birth. It most frequently happens that deaf-blindness from birth is accompanied by grave cerebral lesions which lead to premature death.

and that of Laura Bridgman, who was not only deprived of eyesight and hearing, but also of taste and smell, the irrefutable proof is evident that impressions obtained by touch alone suffice for emancipating a mind, and for enabling it to soar towards the highest summits which the human intelligence has hitherto explored.

Since Helen Keller has been able to do all that we have stated, why should we be astonished to meet with blind persons who hear and talk who have attained the integral development of their intellectual faculties? Helen Keller's example shows us how rich are our brains with heredities of long centuries, fashioned as they are for everyday life, eager to receive ideas and to make these germinate. It also proves to us that sometimes a pale ray of light will suffice for breaking the crust of darkness which surrounds them and for fertilising them. The mind of the blind man, which we are apt to think of as so sombre, is penetrated through and through by the light from outside. Without dwelling on taste and smell which, although rich in sensations, only bring ideas that are too elementary, it has the sense of hearing and that of touch, the former for the spoken thought, the latter for the written thought, both of them precious for making exterior objects known. Through these two windows, opening wide on the world, multitudes of ideas enter. What does it matter if the blind is down at the third window? Daylight has penetrated sufficiently within for everything to be in complete activity there.

We shall speak again more fully of the sense of touch, which has its own language and its special methods for reading and writing. Its high intellectual value has been sufficiently proved by the example of the deaf-blind. It is not by the eye, but by the

hand that, from the sensorial point of view, man is distinguished from the animal. We shall have to ask ourselves how, and by what kind of education, it can take the place of the eye in the representation of objects, in the conquest of the outside world and, consequently, in the constitution of the intellectual equipage necessary for thought. I will only briefly indicate here how incomparably advantageous the situation of the blind person who hears is to that even of Helen Keller, and what a prodigious stimulation for thought, hearing is.

The faculty of hearing represents for a person the spontaneous, involuntary acquisition of language and, consequently, of a good share of human experience. It is, as a matter of fact, by means of language that our minds are elevated to the conception of general and abstract ideas. Our progress in the order of abstractions can only take place by means of parallel progress in the assimilation of language. Thanks to hearing, the mind of the child is, as it were, moulded from its earliest age by abstract ideas, elaborated by the common conscience, which endeavours to invade and enrich it. That is not all. By the sense of hearing, no less than by that of sight, man is plunged into a world of sensations which stimulate him. He is encircled by them. Passive as he is supposed to be, he is snatched from his torpor and drawn into the common life. Constantly incited by the conversation of his parents, his brothers and his sisters, which brings him thus into the outer life, the blind child's mind cannot remain in inaction. There is no reason why it should become numb from idleness. Provided that one pays attention to the child, that things beyond his comprehension are explained to him, he will not remain behind any children of his age. Later on, when he is a man, the

conversations of the persons around will constantly draw him out of himself as sights would do, they will prevent his mind from becoming isolated, from falling back on itself, from shutting itself up in its prison.

Montaigne, who understood this perfectly, said: « I would be more willing to lose my eyesight than my hearing, » and he said this, no doubt, because he liked conversation more than any other pleasure, but also, curious as he was and always insatiable with regard to new ideas, enjoying to the full the free play of the mind, he knew very well that, generally speaking, the ear aliments and stimulates our thoughts more than the eye. He found that conversation was the most fruitful of exercises. Is it paradoxical to think that the sense of hearing is a more intellectual sense, in a way, than the sight? The eye, after all, only furnishes the mind with pictures of outside objects; the ear brings ideas to the mind, it brings all the work of reflection that thought has stamped upon these objects. Aristotle said that sight was the most important of all the faculties for the needs of animals, but for the intelligence, hearing was more necessary. It is hearing which serves as the real bond between minds. In manual work, the deaf man who sees is superior to the blind man. From the intellectual point of view, I am convinced that the position of the blind man who hears is preferable to that of the deaf man.

## 4

As a matter of fact, even before the time of Valentin Haüy, many blind men seem to have arrived at a certain renown on account of their intellectual cul-

ture Unfortunately very little is known about the conditions under which this developed and the means employed. We have no precise information either respecting their psychology. Many of them we know only by name. Among these are certain Greeks and Romans, such as Diodotus the Stoic, and that Aufidius about whom Cicero speaks in his *Tusculanes*. Didymus of Alexandria, who lived in the IVth century of our era, is a little better known. Towards the end of the Middle Ages, a few savants are mentioned who had a remarkable memory. Such, for instance, were Nicaise of Malines, or of Verdun; Fernand, of Bruges, and Pierre Dupont, of Paris. About Ulrich Schomberg (1601-1648), we have the testimony of Leibnitz. « He taught philosophy and mathematics at Koenigsberg », says Leibnitz, « to the admiration of the whole world. » Although he did not lose his eyesight until he was two years and a half old, he had no recollection of light and of colours, so that visual impressions had nothing to do with his intellectual formation. In the eighteenth century, the Swiss, Huber, owed a certain reputation to Voltaire and, thanks to Diderot, the Englishman, Saunderson, was known in France. The former studied the habits of the bees; but we must remember that he had commenced his work when he could see and that he could, therefore, have recourse, constantly, to his visual imagination.

Saunderson became blind in early childhood and, in spite of this, he appears to have carried on his mathematical studies to a very advanced stage. He became a Professor in the Oxford University. Moyses, a Scotchman, at the end of the eighteenth century, was a Professor of Physics and Chemistry, and many others of the blind men I have mentioned taught those who could see. Penjon, too, at the

beginning of the nineteenth century, was Professor of Mathematics at the Angers College. Mathematics and Philosophy seem to be the subjects preferred by the blind who have taught.

As regards blind poets, besides the Greeks of legendary times, such as Homer and Tiresias, and a few Arabs whom we only know by name, we can only mention Malaval in France, and Blacklock, in England, who attained a certain celebrity ! We do not place the great poet Milton in this category, as he did not lose his eyesight until after his fortieth year. (1)

These men may not have attained to any brilliant or remarkable success. We learn, however, from their example that blindness does not prevent the full development of the intellectual faculties. Whoever may wish to prove this for himself has only to visit a centre of educated blind people. This can be found now in every country, but particularly at the Institutions for the Blind. In every country, too, one meets with blind students who frequent the Universities and specialise, in various subjects, with great success. In France, we know a blind Doctor of Philosophy, a Doctor of Letters, two Licenciates of Letters, a Doctor of Law and several Bachelors of Letters. The progress along these lines has been so remarkable during the last twenty years, since the methods of instruction have been improved and made accessible

(1). I do not speak of Augustin Thierry, of William Prescot, the American historian, of Monseigneur de Ségur, of Victor Brochard, Professor at the Sorbonne, of Henry Fawcet the English Postmaster General, of George V, King of Hanover, and of many others who, after losing their eyesight, continued their work of various kinds in such a way as to astonish their contemporaries by their activity. The essential psychological problem that we are studying here is that of education. The men we have just mentioned showed, though, by their example, that on losing their eyesight, they had only lost one tool of infinite value, but that their intelligence remained intact.

to all, that it has been considered necessary to group together, in an International Union, all the blind who are anxious to continue their studies, or to specialise in any particular branch. The « Association of Blind Students », which has its centre in Geneva, organises the exchange of books printed in relief; such volumes being only too rare. It also helps students, writers, and professors of various nationalities, to make the acquintance of each other. The sixty members that it has grouped together, up to the present moment, give a very insufficient idea of the intellectual activity to-day in the world of the blind. Certain countries, among which are England and the United States, have not yet joined this Association. In England, many blind men are continuing their studies with the idea of joining the Anglican Clergy, the only Clergy which has, as yet, opened its ranks to blind candidates. In order to give an idea of the real significance of this movement for a higher education among the blind, we must take into account the fact that it is being pursued in spite of the advice of certain prudent people, and in opposition to practical requirements. Most of the blind need to earn their living, as blindness prevails more particularly among the poorer classes of society. Now, except in a few particular cases, higher education has not sufficed as a means of livelihood for the blind. Music and commerce attract some of the most intelligent and prudent. The higher culture is a luxury, a kind of debauch, and as long as things are like this, the proportion of blind men attempting to educate themselves, in this way, will remain relatively small. There is no doubt but that under different circumstances, this would be very different.

In the past, many of the blind men we have just

mentioned, and very many others that we have not known, have, entirely alone, without the help of any method, or of any tradition, managed to cultivate their minds. At present there are houses prepared to receive and teach them, a special system of education for them and methods of work adapted to their needs. There will be nothing very surprising then, if they should now, in large numbers, arrive at the same result as their predecessors.

## 5

Then too, it is worthy of note that blind men now wend their way in the most varied directions of the intellectual world. They are interested in philosophy, theology, mathematics, philology, the history of literature, *belles-lettres* and law. The most diverse tastes are all represented. Only those branches of knowledge for which eyesight is absolutely necessary are left alone: medicine, for instance, and the various specialities of natural history. The only obstacle then to be feared is not in the intellectual faculties of the blind man, but in the material conditions of the work. The obstacle is from without and not from within. Experience proves to us by this, and by many other signs besides, that the intelligence of the blind is not only equal to that of those who see, but that it does not differ in nature, that it is not distinguished by any special characteristics. Diderot could not believe that this was so. He saw in intelligence the resultant of the sensations and therefore, according to him, the loss of one sense must necessarily modify the very essence of the intelligence. He considered that the blind man was different, from a metaphysical point of

view, from other men, that his mind also was peculiar to him. He has built up for us entirely the mind and metaphysics of the blind man. Without going as far as that, many clever men are very apt, not only in their conversation, but also in their writings, to pronounce dogmatic, and also contradictory judgments, about the natural dispositions of the blind. I have read somewhere that they are specially gifted for abstract thought, and I have also read that abstract thought is inaccessible to them. Experience has simply swept away all these fine logical constructions, which were supported by very seductive arguments. As a matter of fact, observation shows that thought, not only with the blind who can hear, but also with the deaf-blind (1), presents no special characteristics determined by the infirmities of the body, that it is not led by these infirmities to conclusions which an outside observer can foresee. With equal knowledge, it has the same degree of liberty as in an intact body.

For those, however, who like to establish distinctions, I will own that there are certain peculiarities to be noted, which, although not by any means to be found with all the blind, are frequently to be met with in their little world. I will say that intellectual distractions are exceptionally dear to the blind. This can be easily understood. It is by the eyes that ordinary men get the greater part of their enjoyments. Deprived of such enjoyments, the blind

(1). In his study of Helen Keller (1905), Professor Stern, of Breslau, shows that the acquisition of language and of ideas took place with Helen Keller in the same order as with normal children. The only difference to note is in the rapidity of her progress. In spite of the special obstacles she had to conquer, (as Helen Keller, in spelling her first words at the age of seven, was six years behind other children), she developed much more quickly. In one month she made such progress as would have taken a child of one to two years, three months.

must appeal to their other faculties. They do not intend to go without their share of pleasure. Here, as elsewhere, we find the substitution of active functions for the one that refuses service. The blind demand compensation, more particularly, from their sense of hearing. It is a well known fact that there are a great many blind musicians. They also demand a great deal from the play of intelligence and of reflection. « I am so happy », wrote Helen Keller, « that I should like to live for ever, as *there are so many beautiful things to learn.* »

The blind are generally very fond of reading. On an average, they are much more fond of it than those of the same intellectual level who can see. In schools for the blind, the hours spent in reading together are recreations that are very much appreciated. I know of blind men who are occupied all day long, tuning pianos or mending chairs, and they spend part of their nights reading.

This taste for reading and this need of intelligent distraction constitute, unless I am mistaken, an intellectual advantage of some weight for the blind. It helps their development. They are also frequently endowed with an excellent memory. This has rather a tendency to deteriorate since they have written more easily, but, on an average, it is still good.

But if we grant the blind certain advantages from an intellectual point of view, the chief one is, I think, a tendency to reflection and to concentration. This has been noticed in a very great many cases. We must not, however, exaggerate anything. With the blind, just as with those who see, as many forms of intelligence exist as there are individuals. There are those who do not concentrate, there are the fitful and those who are original. With those who are

the most highly endowed, though, there is frequently a certain ponderation. With equal intellectual culture there is, I think, frequently more equilibrium and judgment with the gifted blind man than with the man who can see. That is not surprising, for, as we said a little while ago, the sight is the sense for amusement. The less one is disturbed in this way, the less the inner dream is interrupted by outer events, the more one is concentrated on one's self, the more one takes time to ripen one's reflections, and to weigh the for and against of one's deliberations.

I have met, in the world of the blind, some of the most congenial intelligences that it has been my lot to know. I am not speaking of eminent savants, but merely of men living wisely and intelligently, of men who accomplish their daily task with tact, whatever it may be and who, constantly, in their everyday life, give proof of common sense and wisdom. Sometimes, their intelligence,is both solid and extremely flexible. We will not mention anyone by name among the living, but a short time ago a man died who will ever be remembered by those who frequented him.

Ferdinand Bernus was professor of Grammar and Literature at the Paris « Blind Institution for the Young ». He lost his eyesight when quite young. As a pupil in this Institution, where, later on, he taught, he had received a very summary instruction, quite inadequate for the needs of his mind. He was seized with that thirst for reading, of which I have already spoken. He arranged to have books read to him and thus continued his studies by himself. He was appointed Professor when his time came to leave the Institution and, as he had had very little special preparation for his new career, it was to his reading that he owed the thoroughness and

the originality of his teaching, which was distinctly peculiar to himself. He had a singularly delicate taste for literature. He never wrote himself, partly through modesty and partly because his writing would have been very inferior to his conception. Very simply and courageously, he taught an elementary class for thirty-five years, until just before his death. Rather slow, both mentally and phsycially, his first movement was rather to resist the impressions which came to him from without. He was remarkably concentrated though, and his meditation was intense. When once one had been able to pierce through the somewhat cold bark, one found extremely active thought and a man of great penetration and of the most original reflection. His counsel was always excellent. I mention this example for a special reason. It is just this : Ferdinand Bernus was beloved by so many of the blind who had been his pupils, and he seems to have possessed some of the most striking characteristics to be found in the intelligence of the blind man.

It is very evident that this excessive concentration has its drawback. It is the result of a special facility that the blind man has for separating himself from the outer world, but with that facility comes also a greater difficulty in scrutinising this outer world, a difficulty in documentation, in notation of the documents also, in all, in fact, of what may be called the material accessories of intellectual work

It is just on this special point that modern inventors have concentrated their efforts. Certainly they have not established equality. Those who have their eyesight little know, though, how much these inventors have done towards diminishing the inferiority of the blind, and how very much that marvellous invention of Louis Braille has contributed,

by its multiplied benefits, in liberating their minds. It deserves a special mention, as it has really transformed the conditions of intellectual work in the world of the blind.

It is very evident, though, that no invention, no prodigy of human genius, will prevent our having to reckon also on a lamentable wastage, if we may so call it. There are, we must own, many blind men incapable of normal development, and they injure the reputation of their companions in misfortune. Blindness is not the cause of this, as experience shows. The cause may be found in the various maladies which frequently accompany blindness. This wastage, too, will perhaps increase as time goes on. In some places it has been thought, perhaps wrongly, that the intellectual level appears to be lower than it was amongst the blind. Of late years, the progress realised by the preventive treatment of blindness has made it possible to save certain patients who, formerly, would probably not have escaped. Many more will be saved as time goes on. All the ground thus gained will be won for affections that are localised and that only concern the eye, such, for instance, as the horrible ophthalmia of children. Therefore, in the generations of the blind who will gradually rise to the intellectual life, a larger and larger proportion will probably be found of unfortunates whose sight has been lost through one of those deep-seated maladies which affect the brain and the nervous system. Heaven preserve us from complaining of intellectual deficiency *when* it is the result of such cases as these. With all our hearts, we long for that time, which is still very far off, when oculists will not allow any but idiots to lose their eyesight. If ever that day should come, it must be clearly understood that it is not blindness which leads to imbecility,

but that blindness and imbecility both come from a deeper cause.

We must not forget this when we meet with a blind man of poor mentality, and we should resist the temptation, which is so general, of judging other blind men by him.

## Chapter II

# INTELLECTUAL CULTURE AND THE BRAILLE ALPHABET

### I

On the 4th of January, 1909, the little World of the Blind was rejoicing. The centenary of the birth of Louis Braille was being celebrated. Blind delegates had come from all parts of the world. All hearts were moved with veneration and immense gratitude on thinking of that man whose name is so little known, even in France. Those who lived in darkness were fêting their own intellectual emancipation, whilst honouring the memory of their benefactor.

Braille had been blind himself from the age of three. From the year 1828, he had been a Professor at the Paris « National Blind Institution for the Young ». He had been educated there, and it was there that he died in 1852. During all those years, Braille devoted nearly all his time and thought to easing the lot of his companions in misfortune, and he it was who endowed them with that system for reading and writing which is employed, at present, in the whole universe. His memory is as dear to the blind as that of Valentin Haüy. It was Valentin Haüy, who thought of teaching the blind,

but it was Louis Braille who discovered the means which enabled this instruction to bear all its fruit.

He started from a very simple principle, a principle which at present seems to us elementary; but which was, at that epoch, a complete revolution in the instruction of the blind. Valentin Haüy had merely adapted, for the blind, the methods used by those who see. This seems to have been a perfectly natural starting-point. For reading, he kept to the ordinary alphabet. He had this alphabet traced in relief, so that the letters could be felt by the fingers of the blind pupil. This was the way in which most of the blind before him had learned to read and to write. Saunderson, the blind man of Puiseaux, of whose methods Diderot tells us; Mlle de Salignac, of whom Grimm speaks in his *Correspondence*, Marie-Thérèse of Paradies and Weissembourg, with whom he was acquainted, and others of whom he had heard, had all been dependent on this method. They had the Roman characters carved in wood, or cast in metal, and kept them in special partitions. Sometimes the letters were simply traced with a style on strong paper. Valentin Haüy taught his pupils to write with a style. He, too, had characters cast in metal and, with the help of a press, he printed books in relief.

It was seen that the results were not very brilliant. The blind pupil certainly managed to spell out a few phrases, but so slowly that very few could read satisfactorily. When the characters were small, it was confusing to identify them with the fingers. When they were large, it took too long to follow all their outlines. The blind had a few books, but they did not read. The results of the writing were still more unsatisfactory. It was of no practical use, and only served to interest the public. The

education of the blind, therefore and, so to speak, the entire life of the blind remained oral Attempts of all kinds were then made, in various countries, to simplify the drawing of the ordinary letter and to make it more easy both to trace and to feel. These simplifications led to great progress, undoubtedly, but the situation remained unsatisfactory. The blind read rather more, but they still did not write.

The fact was they were talking to the fingers the language of the eyes. This was a fundamental psychological error. The finger is different from the eye. The most rapid ways of reaching the intelligence by the finger are not the ways by which one can reach the intelligence by the eye, in the easiest manner.

The ordinary alphabet is a convention invented for the eye by those who could see for others who could see. Why, therefore, not imagine a convention intended for the finger, and adapted to the physiological conditions of the touch?

The straight stroke is suitable for the eye; it is only felt slowly by the finger, whilst, on the contrary, the finger feels very quickly the dot (1) which may escape the eye.

It seemed necessary then, to make an alphabet of dots for the blind. Undoubtedly the ordinary letters could be traced by means of dots, but these letters are too complicated. They would require too many dots and would, therefore, take too long a time to trace and to recognise. The variety of their outlines would necessitate giving them dimensions

(1). A long time ago psychologists had observed that on touching two short lines of equal length, the one formed by dots and the other one by a straight stroke, the former appears to be longer than the second. If the lines are long, more than four or five inches, for instance, the illusion is just the opposite.

which would exceed the surface of the pulp of the finger. It seemed then necessary to adopt a system of different signs, in which each letter should only have very few dots and, by its shape, be exactly adapted to the shape of the finger.

This idea of breaking away from traditions, and of constructing a purely tactile alphabet, had come to other blind men before Braille, as the very nature of the touch suggests it so strongly. Several attempts of this kind are still remembered. One blind man imagined letters along a piece of thread, by means of knots which varied in shape, size and number. He kept up a correspondence, for a long time, with one of his friends in this way. This person had only to let his fingers wander along the thread, in order to receive the thoughts which had been sent to him. In much the same way, a blind musician, the violinist, Dumas, wrote his music by means of pieces of cork, and scraps of leather and of metal, which he threaded on to strings.

These attempts were not followed up in any way, and their sole interest lies in the fact that they prove to us that the finger was claiming for itself something more than signs invented for those who can see. They were no use whatever to Braille who, probably, never even knew of them. Braille owed nothing either, as regards the principles of his alphabet, to the suggestion of psychologists. He owed them to the lessons of experience and to the intuition of a genius. It is only just to mention, though, that his intuition was prepared, in a large measure, by his predecessors.

I do not mean by the system of Klein, who had imagined, in Vienna, an ordinary alphabet simplified and traced with the help of projecting dots. It is very probable that Braille had not even heard of

this. He knew of Barbier's system though, and he utilised it.

Charles Barbier, in the method he presented to the Academy of Science in 1821, and which was only tried for a short time, not only adopted the dot, but, still bolder than Klein, in order to make the reading and writing go more quickly, he imagined a whole series of absolutely fresh signs. But Barbier's characters had the peculiarity, which was considered a fault, of representing sounds and not letters. They were also too large for the finger to be able to go over them quickly, and this was considered a serious drawback. In all these various ways, the requirements of the sense of touch made themselves heard. One step remained to be taken, and it was a most essential step. It probably needed a blind man to take it, a man living by the sense of touch, in order to give the letter the exact dimensions required by the finger.

The great wonder of Braille's alphabet is that the generating sign is only composed of six dots : three in length and two in width.

This does not exceed the field of tactility, so that the perception is rapid and, at the same time, this field is so well filled that all its resources are utilised. (1) And with this maximum of six dots, the Braille alphabet has sixty-three signs. This suffices for tracing all the letters of the alphabet, and

(1). The separation of these dots may vary. The skin's *sense of place*, as we shall see in a later chapter, varies with the individual, and also with the age of the individual. One writes, therefore, with letters of different dimensions. Generally, the separation of two millimetres and a half has been adopted, as this answers to normal sensibilities (the index, generally, feels distinctly two dots at a distance of two millimetres from each other). It favorises, better than any other system, rapid reading, and it allows the Braille method to be taught even to old people. Dr. Javal, the well known oculist, became blind at the age of sixty-one, and he could very soon read by the Braille system, although he never read it very quickly.

not only simple letters, but vowels with accents and punctuation. There are even signs left over for constituting a system of stenography.

This is not all, Braille wanted his system to be very easily assimilable, and attained this result, thanks to a very ingenious arrangement: — the signs are deducted logically from each other. Following a rational principle, he constituted a first line of ten signs, which represent the ten first letters of the alphabet. From these ten signs, by the simple addition of a dot, the ten following ones are made, and these form the second line. The addition of a fresh dot gives the third line and so on. This rule is not only a satisfaction for the mind, it also presents very notable and practical advantages.

In the first place, as logic belongs to every country, the Braille alphabet could thus become the universal alphabet. Then, the learning to read requires very little effort from the blind child. It requires less effort than for the child who sees to learn the ordinary alphabet. Finally, and above all, for an adult person who sees and who wishes to have intercourse with a blind man, the initiation is mere child's play. (1) I know some blind men who correspond in Braille with those who see, who had no notion of the system. The blind writers sent an alphabet with their letters, and these were then read without difficulty. (2)

(1). A curious experiment of this kind is reported in the « Valentin Haüy, » the chief French organ for the blind and the typologist. In a school of children who could see, a letter of two pages, written in Braille, was read by two pupils of average intelligence, chosen from the class which was preparing for its certificate. Half an hour was sufficient for them to decipher the text given to them. The first five lines took them about ten minutes. The rapidity of the reading increased very quickly. They read, of course, with their eyes, and not with their fingers.

(2). In order to have an idea of the immense number of methods

2

The system of education for those who cannot see was at last able to get out of the blind alley in which it had been struggling.

Of course the Braille system cut off communication between the blind and those who saw. It isolated the blind man by the employment of a special system. The books of those who saw had always been unreadable to the blind man, but from the time of Valentin Haüy and his successors, what the blind man wrote could be read by those who saw. He could, therefore, have intercourse with those who saw. In order not to break off this intercourse, as well as learning Braille, the blind would have to have a way of corresponding with those who saw, in their own language. The problem which Valentin Haüy had had to face was, therefore, still not resolved, and it was necessary to find more practical ways for writing the ordinary letters. It was simplified and considerably simplified. The blind man had now only to write the ordinary letters; he had no longer to read them. The relief alphabet was therefore no longer indispensable for reading.

Braille did not neglect this part of his task, and the methods that he imagined have rendered very real services. One of these methods was improved by his friend, Foucauld, who made a machine corresponding to our present type-writing machines. He was also helped by his pupil, Ballu, who found an excellent way of tracing clearly the Roman letters in dots. As regards this question, Braille did not have

that have been imagined for teaching the blind to read and write, and also in order to appreciate the simplicity of the Braille method, it is very instructive to visit the Valentin Haüy Museum of Paris, or the Museums of Vienna and of Steglitz.

the last word. Other methods have since taken the place of his. At present there are various types of guide-hand, and other inventions, for helping the blind to trace characters, either in dotted relief, or in smooth relief, or even in strokes merely coloured. For the dots in relief, they use a punch, which digs into the grooves of a piece of metal prepared for this purpose, or dotted letters like the characters of printing which are engraved in the paper. For the strokes in relief, they use a style in the same way as a pen, but a pen which gauffers the paper, by means of a piece of cloth placed underneath.

They trace the coloured strokes, sometimes with characters used for printing, imbibed with ink, but much more often with a pencil which either writes inside little compartments, each one of which is intended for a letter. or circulates freely in lines, the top and bottom of which are marked.

Type-writing machines are still more practical and the relief writing of both forms, strokes and dots, has given way rapidly to the pencil and the writing-machine. The slowness of the old methods was also a great drawback. The blind person no longer has recourse to them, except when it is absolutely indispensable for him to read what he has written to those who see, that is to say in quite exceptional cases. (1) Nothing could show more plainly than this how Braille has simplified the problem of ordinary writing. It was, certainly, very inconvenient to have to learn two systems. But both of them were very simple, and there were such inestimable advantages to be gained by them. The Braille letters are very easy to form. They simply need a

(1). A few blind men still make use of these methods for addressing their correspondence. At present, this is, perhaps, the only use for such methods.

very simple and elementary movement, that is to make a dot. Thus, with a very slight apprenticeship, this writing is from five to ten times more rapid than the ordinary writing in relief. A person who can see and who writes with his pen, on an average, twenty to twenty-five words a minute, might probably find it desperately slow, as only from ten to fifteen words can be written in the same time. (1)

All the same, it is now possible to take notes in this way and so, with just a sheet of paper, help and relieve the memory and increase one's mental stock indefinitely.

As regards reading, the progress attained by means of Braille is, perhaps, less striking, as one used to read the ordinary alphabet without writing it. It is all the same a most valuable invention. The blind man does not, certainly, enjoy that wonderful rapidity of reading by sight (2) which enables anyone to take in some five hundred words or more a minute, and so to devour the pages of a book, but, on the other hand, the blind man does not need to spell out his words like a child. He can read in a way that makes it quite agreeable to himself, and it is quite endurable to hear him read aloud. Many blind persons read at the rate of from a hundred to a hundred and twenty words a minute. I know of one who exceeds two hundred words, that is to say he reads distinctly more quickly than an orator speaks, as the latter rarely exceeds a hundred and fifty or a hundred and sixty words.

(1). Since the Braille alphabet has been adapted to typing-machines, it is of course more rapid, but the use of these machines is not yet very general.

(2). According to Javal, from whom I take most of these figures, the eye perceives, on an average, ten letters at a time, whereas the finger only covers one. As regards Braille, I have slightly rectified the figures given by Javal, who, judging by the slowness with which he read and wrote it himself, gave a lower average than that which we have constantly proved.

The superiority of Braille, as regards reading, consists in the fact that the Braille letter is of very simple form and, as it does not exceed the limits of the tactile range, it is felt at once, without the finger having to move up and down. Of course, if we watch a beginner, we shall see his finger moving about. He appears to be rubbing the letter in an impatient way. With readers who are accustomed to this method, the only movement noticeable is from left to right, a movement that is made in order to follow the line. Even in the Klein system, which is, perhaps, the best of the methods with ordinary characters, and which has one of the advantages of Braille, since dots are used, the same result is not attained. The finger does not, without moving, feel the whole letter clearly, or rather it only feels clearly letters of the simplest form, such, for instance, as I. O. and a few others. For most of the letters a slight rubbing is necessary. This requires a greater expenditure of time and of mental force than for the Braille reading.

In the Braille method, not only does the right hand move more quickly along the lines, but frequently the left hand takes a more active part in the reading. For beginners, the rôle of the left hand is to stay at the beginning of the line that the right hand passes along alone, so that the left hand points out to the right the beginning of the line that it has to take next. Gradually, however, it gets into the way of deciphering the first letters of every line, and so helps its companion. The progress that it makes in this way varies according to the individual. It is all the greater, of course, when the work of the right hand absorbs in a less degree the reader's attention, and a system which, like the Braille, only demands a comparatively slight concentration of the mind

facilitates this progress. With certain readers, for instance, the left hand will advance nearly half way along the line.

The two hands then are working almost equally. One sees them, with a perfectly regular movement, and with a rapidity that astounds uninitiated onlookers, meet in the middle of the line, and then move away again to the end and meet again in the middle of the next line. This will go on from the top to the botton of the page, as though the two hands were being worked by a secret spring.

In this way, reading has not only become more rapid, but, with the rapidity, it has become more agreeable and more instructive. The attention, less diverted by the material work, has been able to give itself up more completely to the thought expressed. With reading so much more easy and profitable, the taste for books has increased amongst the blind and now occupies a larger place in their lives. Education by means of books gradually succeeded oral instruction, and this has continued not only in the school, but for the whole life. It will easily be seen how much more accessible intellectual culture, under all its different forms, has now become.

In Vienna, where the Klein system only gave way very slowly to the Braille system, the two methods even being continued side by side with each other for a long time, Monsieur Heller tried an experiment a few years ago. He instituted a competition between the cleverest readers of the two methods. The results of this comparison do not sufficiently show the progress that the Braille system has realised in France. In the first place, the Klein system not having penetrated into France, it was not with that system that there was any rivalry, and then, too, the

Braille readers who took part in the competition were not first rate champions. The experiment was instructive though, and all the more interesting to note, from the fact that the countries of German language, where the experiment was made, had objected to the Braille system for a long time. Texts, both of poetry and prose, were given to the competitors. In prose, the Braille champions read a hundred and fifty-eight words in two minutes, whilst the Klein champions only read a hundred and six. In poetry, the difference was still greater : a hundred and forty-six words in the same time as seventy words. (1)

Another experiment shows how much freer the play of the intellect is with the Braille system than with the Klein. Monsieur Heller proposed to his candidates texts composed of words of two syllables, one of words that really exist, and the other of imaginary words absolutely meaningless. The two texts in the Klein system were read with about the same speed : forty-three words against thirty-nine. With the Braille system, whilst ninety-two words of the former were read in two minutes, the meaningless words of two syllables were only deciphered at the speed of sixty-eight words. It is, therefore, evident that with the Braille reading, the mind collaborates more with the finger, and that it is less paralysed by mechanical work.

## 3

The benefits to be derived from the Braille system have been gradually developed, thanks to applica-

(1). We must remember, with reference to these figures, that the German words are longer on an average than French words. It is, however, the comparison of the numbers that is interesting.

tions which gradually revealed the resources it was found to contain. Various methods of printing were invented which have led to a great increase in the number of books. Then, by various means, the writing of it has been made less slow and less large: two systems of stenography, the one orthographic and the other phonetic, allow us to gain respectively: in time from 30, 46 % and from 57, 75 %, and in space from 31,91 % and from 44,86 %. In the second place, printing on both sides of the page has been obtained by means of an apparatus of very great precision, which allows of the dots on one side being placed between those of the other side. Then, too, different types of keyboard machine allow of the dots being made simultaneously, instead of writing them one after another with a punch.

The Braille system has also been adapted to the requirements of mathematical studies. Not only has it supplied a set of signs for representing the most complex arithmetical and algebraical equations, but by using the Braille figures, various calculating machines have been made, which allow the blind man to take down mathematical operations of all kinds and to execute them rapidly, (1) thus doing away with the servitude of mental calculations.

The most valuable of the Braille applications is musicography in dotted relief. The 63 characters, which the generating sign furnishes, suffice for all

(1). The chief of these machines is the *cubarithm*. Thanks to the property which the Braille characters have of giving different signs by a mere change of position, it has been possible, on the six sides of one single cube, to represent, not only the ten figures, but all the signs necessary for simple mathematical operations, in all nineteen figures. It is only necessary to place the cubes in the little divisions of a small tray, made for this purpose, in order to work out all the problems.

needs and, at present, any piece of music can be transcribed without the omission of the least sign. Certainly this musicography does not give the blind man the faculty of reading music. His hands, which are being used on the key-board, cannot follow the pages of his piece. The reading is only possible for singing, when the hands are free and, in a large measure, on the organ, where the left hand can follow the music whilst the right hand plays, seconded by the pedals.

Then too, as learning by heart is the law of the blind, musicography with projecting dots makes it possible to learn by heart, in another way than from ear, or by outside help, when the blind man is not endowed with an exceptional ear for music. It is by means of this that the blind occupy, in the musical world, the place which they have already held for a long time.

In spite of so many advantages, the Braille system has taken a long time to conquer the world. The history of its gradual victories is the history of a long struggle of the finger against the eye. The interests of the finger were, of course, represented by the blind; those of the eye by professors and directors of special schools for the blind who, for the most part, could see. The latter objected to an alphabet which was not pleasing to the eye, because, as they never read with their fingers, they did not realise the invaluable merits of such a system. Their pupils, on the contrary, when they had once tried Braille's dots could not give them up. Sometimes they continued, when in class, to make use of the prescribed method, whilst all their own notes were in Braille. It had needed a blind man for imagining a tactile alphabet. It required the persevering efforts of blind men everywhere, in England, in France and in

Germany, for the system to be adopted. At present, except in the United States, there are scarcely any divergences, and even there, of the different systems which are still opposed to Braille, the chief ones are issues of the Braille method. All these systems prove that the ingenious alphabet which Paris gave to the World of the Blind rests on very solid psychological foundations. (1)

4

In the entire domain that has been conquered so far, very much the same way of using the Braille alphabet has been adopted.

It was not enough to teach it in the schools; it had to be used for giving to the blind the intellectual and moral nourishment that they needed. Several presses are at work in each of the big civilised countries, and copyists complete this work by means of manuscript transcriptions.

In France, we have three printing houses for the blind which are really active. In the first place, they print periodicals in dotted relief, such as exist now in a varying number in all the large countries. (2) The *Daily Mail* brings out a weekly edition in Braille. In France, we have eight little reviews of this kind, monthly, fortnightly, or weekly. Two of them, the *Louis Braille* and the *Revue Braille*, have passed their thirtieth anniversay and form a collection of more than 150 volumes. The *Louis Braille* keeps the

(1). In Anglo-Saxon countries, the Moon alphabet, which is merely the ordinary alphabet very much simplified, is still very much used, but chiefly by those who have lost their eyesight late in life, and who have not cared to learn a new alphabet.

(2). There are at present 63 periodicals in Braille, twenty in English, 19 in German and 10 in French.

blind informed about events in their own particular little world, whilst the *Revue Braille* tells them the literary, scientific, musical, and even political news, which everyone ought to know.

The printing of books is certainly more advantageous. This printing is, however, very expensive and there are not many purchasers for the books. The size of them is also a serious obstacle to the constitution of really rich, private libraries. For all these reasons it was necessary, for a long time, to keep to the classics and the books which were absolutely necessary for the exercise of the professions usually taken up by the blind.

Braille's invention could not, therefore, bear all the fruit which one had every right to expect from it. It made the teaching of the blind more easy, but it did not give the daily pleasure and distraction so necessary to those deprived of eyesight. It did not give them the possibility of freely cultivating their minds and of increasing their knowledge in every direction, instead of limiting themselves to their own special sphere of activity. It was for this reason that Monsieur Maurice de la Sizeranne, a blind man who has devoted his whole life to the blind, has, in order to continue Braille's work, founded a library of manuscript volumes which are lent to all the blind of France.

Our Braille Library has only been in existence 25 years and it already has more than 30,000 volumes. It is one of the most touching masterpieces of human solidarity. Nearly all of these 30,000 volumes have been transcribed by people of a certain social position, chiefly by ladies and young girls, who devote so many hours a day, or week, for preparing the means of entertainment and of education for the blind. Each one of these millions and of these thousands of mil-

lions of little dots, which fill the volumes piled up on our shelves, and the multitude of which staggers the imagination, is a deed of charity, and collaborates, in its own special way, with Braille's great work.

Similar libraries must have been founded in all countries, but our Braille Library certainly has not its equal in the world.

No other approaches it in importance. It is a very original library to visit. On the shelves, where the big volumes are closely packed, all the indications and landmarks are in Braille. The librarians, who serve the public, and who move about continually in that labyrinth of little, narrow passages, bounded on each side by walls of books, are all blind. Everything is written for them in relief: the catalogues, in which they find the books asked for, all the library cards, the registers containing the names of the volumes lent out, and even the numbers inscribed on the cover of each book. If you ask the Head Librarian to read you something, you will be amazed at the speed with which his fingers will travel over the lines. Living always in the midst of his beloved books, he has become a wonderful reader.

On Wednesday, every week, the rooms are filled with blind men who place big parcels of books on the tables. These are the habitués bringing back the volumes which have entertained them during the week. Friends meet each other and discuss their private affairs and their reading. They go away as heavily laden as they came, taking with them fresh provisions for the forthcoming week. Wednesday is the day for the Parisians. On the other days, the provincial readers are served. Parcels of volumes are sent off in all directions, and are

returned after having passed under very many fingers. The parcels are returned more or less quickly, according to the curiosity of the readers. Large cases, containing about forty volumes, are sent to important centres where there are many blind. These cases are kept three months in each town, and those interested can borrow books freely. The cases go from town to town, north, south, east and west, and are not returned to Paris until they have been all round France (1). Let us follow them in our imagination. At every halt on their pilgrimage, they are hailed with joy. They go into many wretched homes and are the salvation of the blind living there, as, without these volumes, many unfortunates would be entirely thrown back upon themselves, in great moral distress and discouragement. The books take with them, into such homes, a ray of happiness and light, the only light which can penetrate to the soul of the blind. The letters of thanks, full of deep gratitude and emotion, which are constantly being received at the Library, prove how fertile is the apostleship of these volumes. To the deaf-blind these books are the staff of life, the only bond which unites them with the rest of the world. « The Braille Library », said one of these, « has been a veritable intellectual salvation for me. » Another one said : « With my books, it seems to me that I am no longer blind..... I forget my misfortune and feel that I am living once more. There is no longer that frightful isolation, discouraging darkness and night, that death-like silence which made one feel so near to the grave. It is the resurrection now, the return to life, light, to the freedom of the mind. It is, for me, the joy of the captive when he sees his fetters fall from him. »

(1). About 50.000 volumes a year travel in this way.

An important section of the Braille Library is reserved for Music. Letters are constantly being received asking for scores. An organist in despair writes, as he has been asked for some special Church music for the following Sunday. A music teacher has a pupil who is to play a certain piece that the professor does not possess. If he cannot teach this piece his reputation is at stake.

Another music teacher, who is not blind, has only to buy the piece in question at the nearest music shop, whilst the blind man may lose his pupil. The Braille Library comes to the rescue in such cases. It lends what is required and so helps to make life more easy for those concerned. I am only now speaking of material help, of benefits that are immediately tangible. Its wide-spread activities and the steady infiltration of its influence are invaluable. It is helping to raise the standard of the musical culture of the blind, not only as regards the technique of their art, but as regards subjects relating to it, such, for instance, as the history of music and even subjects having no relation to it, but a knowledge of which is necessary for a man who wishes to take his place in the world.

Before the Braille Library, when school-days were over, only those who had someone at their disposal for reading to them, could continue any daily reading. It was only in a few rare cases that the blind could afford to pay a reader, and so, as a natural consequence, reading was given up. At present, when school-days are over, pupils are invited and encouraged to keep up the education acquired and to increase their knowledge. A characteristic fact proves the progress accomplished. Nearly all blind men of more than forty-five years of age read badly, whilst nearly all good readers are younger than

forty-five. They belong to the generation which has had the advantage of the Braille Library. The former get people to read to them when they can. The latter, no doubt, do the same when they can, but they also read themselves, and consequently they read better and much more.

The Braille Library, admirable as it is, does not suffice for all that it has to do. There are important works that are not on its shelves. All intellectual standards and all kinds of different tastes are to be found among the blind. How could 30,000 volumes, which constitute, perhaps, about 5000 or 6000 works, suffice for so many different needs and requirements? — But the past answers for the future, and the Library, which so justly bears the name Braille, is certainly a magnificent result of the work of that clever inventor. Thanks to the Braille Library, the cultivation of the mind, by means of the sense of touch, has been rendered possible.

## Chapter III

# INTELLECTUAL WORK. — AN EXPERIENCE

An Academician said recently : « A blind man requires ten times more time to learn ten times fewer things than a man who can see. » We have just seen that facts contradict such an opinion. It is proved incorrect both by what we know of the intelligence of the blind, and by the considerable progress in methods of culture realised by means of the Braille alphabet.

Undoubtedly, with regard to documentation, there is much more difficulty for the blind man than for the one who sees. There are fewer books at his service. He is less tempted to read them. Many of them are only accessible to him by the help of a person who can see. In an ordinary way this is not felt much, and blind musicians and workmen are, as regards general culture, at least the equal of those who can see. But it is difficult to believe that all this is not an unsurmountable obstacle for those who wish to attain a higher intellectual development.

One example will show us that, in favourable circumstances, even works of erudition which require the most minute research and the handling of considerable material are not impossible for the blind. We shall see the wonderful services that can be obtained by means of Louis Braille's invention and the facility with which it lends itself to all needs. I

apologise for speaking here of myself and the books that I have published on Montaigne. I have been led to it by a learned critic (1) who, in an article in which he speaks very kindly of my books, asks me what methods of work a blind man can employ in order to take up such studies. As a matter of fact, I am in a way speaking less of myself than of Braille, for it was thanks to Braille that I was able to do this work, and that others are able to do as I have done. Therefore, from the point of view of the psychology of the blind, the interest of my books on Montaigne is to show that, thanks to our special methods, philological researches and works of erudition are perfectly accessible to us.

## I

I lost my eyesight at the age of four and a half. Of my earliest years, I have no distinct visual recollection. This is, perhaps, due to the fact that careless childhood does not fix its attention much on anything, or perhaps, rather that in the complete darkness in which I lived from thenceforth, no visual impression could come to awaken sleeping memories. In a large Bible that was opened in my presence, I have a faint idea of an Abraham sacrificing his son, and of an angel coming down from Heaven and holding back his arm. Perhaps the wings of the angel, which struck my childish imagination, left some trace in my memory. But all that is so vague that I scarcely dare believe in it, and if I endeavour to insist on this memory, every thing vanishes immediately.

(1). M Victor Giraud, in the *Revue des Deux Mondes*.

It is rather a memory of vision than a visual picture. I have fairly clear ideas of colours, but, not being able to verify these ideas, I do not know whether they are exact or not.

When my eyes closed, I could not read. My education has, therefore, been entirely that of the blind.

I took my first lessons by listening to my brothers reading aloud. I was found to have a good memory. When I was eight years old, an age when the sense ot touch is still very keen, I began to study the Braille alphabet. Thus, whilst very young, I was familiar with the two essential methods of work of which I was to make use later on : reading aloud and reading by touch, or tactile reading.

After staying for a time at the « National Blind Institution for the Young », in Paris, I became acquainted more thoroughly with all the special methods for the education of the blind. They were better taught here than in most of the other schools and, in this way, I was prepared for my future studies in different colleges of Paris. When there, for Latin, Greek, and often for French, I was short of the books in relief. I copied, and had copied for me, those which were indispensable. Devoted friends helped me in this task. The Braille Library lent me many volumes. But more often, as formerly, I learned my lessons with a secretary or with a friend who read them to me. I constantly made use of the Braille system for taking notes of what I needed to remember specially, for writing the rough drafts of my work and, more particularly, for taking notes of the lectures or lessons at college. Thanks to continual practice, I used my punch with great speed and, by means of a system of stenography, which I gradually enriched with fresh signs, I did not miss

a single sentence of the lectures. As to the written work, which I had to give to the professors, I did it with a type-machine, the one which I am using at present. It is a machine which does not differ in any way from the ordinary one. I cannot see the letters inscribed on each note, but my memory is keen enough to make up for the defect. Good typewriters who can see also write without looking at their key-board. The only difficulty was that I could not read over my work. For this, I was obliged to have recourse to someone who could see. Thanks then to these methods and thanks, too, to the kindness of excellent masters, some of whom have helped me with boundless patience and devotion, I had no difficulty in keeping up with my fellow-students and I came through my examinations with success. At the same time, I gradually accustomed myself to make the best of the conditions of work before me. I learned to profit as much by the reading which I heard as by my own reading. I took down more and more notes in Braille, and I classified my notes in a methodical and practical way. All this was destined to serve me later on.

When I entered the Higher Normal College, I felt at once that a change was to take place in my studies. To the work of assimilation, which is that of the secondary teaching, was now added the work of production, scientific work. I must confess that, at first, I felt a certain anxiety and disquietude. For all this one had to go to the sources, to handle a number of books without any guide.

My tastes led me in the direction of literary history, and in no kind of study does documentation present as many difficulties as in history. I sometimes regretted that I was not a philosopher, for I used to say to myself that a philosopher needs less

books and draws more from himself. I am not so sure of this, though, at present.

It was now absolutely necessary for me to learn to use, as methodically as possible, bibliographical instruments, in order to guide a secretary more surely. This secretary would, from henceforth, have to be inseparable from me and lend me his eyes, but eyes that would be more and more passive as the work became more and more individual and more and more complex. Before leaving college, I had become devoted to the study of Montaigne.

## 2

So that my readers may understand what my work was, it seems to me necessary to remind them, briefly, of the stage which the study of Montaigne had reached, when I took up my work, and of the object I had in view.

It had been customary to read *Montaigne's Essays* altogether, as a homogeneous work. People looked for one idea in his philosophy. They expected almost a system and, as many contradictory opinions are to be found there, by some Montaigne was considered to be a Stoic and by others an Epicurean. Some readers declared that he was a sceptic whilst others considered him almost dogmatic. Some thought he was religious and others affirmed that he was an atheist.

As regards his art, there were just as many contrasts. By the side of chapters somewhat void of originality, there were the admirable Essays that everyone knows, those Essays which are so individual and so rich in every way. It seemed to me that all these apparent contradictions and these oppositions

were explicable, and that they corresponded with the differences of date in the composition of the Essays. The ideas of Montaigne had varied from epoch to epoch, just as his artistic manner had changed. To find, as nearly as possible, the successive stages of his thought, the different layers, as it were, that were deposited in his mind by the transformations of his work, or, in a word, to retrace the evolution of Montaigne, as a philosopher and as an artist, this was my plan.

In order to carry out this plan, the first thing to do was to determine the chronology of the Essays. The very first thing was to find out the allusions contained in them to contemporary events, to identify such events, frequently somewhat obscure, and to determine their date. This was done, sometimes, only after long researches. Without a firmly established chronology, though, there can be no historical study.

In order to fix this chronology, and to throw some light on the evolution which it was to show us, it was very important to find out what Montaigne read. Several chapters inspired by the same book seemed likely to be contemporaneous. The series of readings might reveal a great deal with regard to the series of compositions. I had to begin, therefore, by reconstituting what could be found of Montaigne's library, and, as I put back the books on their shelves, find out, for each one, what had been borrowed from it.

This delicate and far-reaching piece of research work was the starting point necessary for my task, and it constituted the heaviest part of it. In order to understand how it was possible to undertake it, and how it could serve as a solid foundation for the edifice I wanted to build up, it must be remembered that Montaigne liked quoting from the authors who inspired him, and that his quotations were

generally very faithful ones. In the Essays, we find phrases copied almost word for word from the books he liked. Sometimes he only alludes to them, but his allusions are so exact that one can indicate the source with certainty. As Montaigne liked talking of what he read and frequently gave his impressions on the various books, it seemed very likely that I should be able to carry my enterprise through. It had been commenced, and very well commenced, by annotators such as Coste and Victor Leclerc. I had, therefore, only to continue with still more precision and patience.

My first care, then, was to transcribe, integrally, into Braille Montaigne's Works. My collection of the Essays consists of about twenty volumes. I could then study them easily and without any outside help until I was, as it were, penetrated by them. I then adopted the card system for classification. My cards, which were, of course, in Braille, were divided into three categories. In the first group, were inscribed all the ideas expressed in the Essays. In the second group were all the images, the characteristic expressions, all that was figurative or, in a word, all the pecularities of style. In the last group were historical examples, anecdotes and the stories of all kinds with which the Essays teem. These three heaps of cards were then classed, separately and alphabetically, and placed in a large box, which, for several years, was always within reach of my hand.

The characteristic word of each of these cards, that is the word which assigned to it its place in the alphabetic classification, was written at the bottom and, as the cards were all placed head first in the box, I had only to run my fingers along the partition I required, in order to find, immediately, among the considerable quantity of cards, the one I required.

I do not think it took me any longer to find the card than it would have taken a person who could see. As I was seated in front of my shelves, I had only to read, in this way, the books which Montaigne had known.

Every time that I was struck by an idea, an image or an example that I had met with in the Essays, I stretched out my hand for the card on which this detail was inscribed. On finding it, I had only to turn to the exact page of Montaigne and could so verify if my memory had been correct. If, as I presumed, there was anything borrowed or any allusion to the passage, I wrote down my discovery in Braille on the card, upon which a few lines had been left for this purpose.

In order that my research might prove fruitful, I had to read all that seemed likely to have interested Montaigne, and his mind was inquisitive to an insatiable degree. In his time, Latin and Greek literature was almost entirely vulgarised and his education led him to draw largely from the Ancients. He also read many French and Italian books. It was, therefore, in Greek, Latin, French and Italian books, published up to that date, that I had to look, in order to carry out my research. The first thing was to find the titles of these books, by means of my various bibliographical instruments. Then the books likely to interest me had to be searched for in Public Libraries, and such books had, in many cases, become very rare. Many of them had not been reprinted since the XVIth century. For those that had been reprinted, it was necessary to have recourse to the edition of Montaigne's epoch, as sometimes the more modern ones differed from the original edition.

Unnecessary to say that nothing of all that had

been transcribed into Braille. I could not, therefore, read such books myself, but had to have them read to me. This method of work, as I have already said, was quite habitual to me, and for works of no artistic character I prefer to hear them read rather than to read them by touch.

For a research of this kind, though, there are certain drawbacks to this method. In the first place, it is impossible to glance through a book quickly. The eye can so easily eliminate any useless chapter, and glance down a page in order to be sure that it contains nothing interesting for the subject in hand. Nothing can replace the eye for this work. One has to resign oneself to listening to developments that are quite useless for the work in hand, rather than run the risk of skipping some important idea.

When I ventured to cut out here and there it could only be with great care. It was necessary to know all the various directions which reasoning might take. When one direction proved barren, it was left, but one had to be very careful not to pass by the exact spot at which the thought had taken a fresh path. Sometimes we agreed that, at a sign from me, such as a tap on the table with the ruler, the reader should not continue the sentence commenced, but should pass on, according to the nature of the book, either to the following sentence or paragraph, or to five or six lines lower on the page. But this method was not quite satisfactory and could only be adopted in rare cases. Another difficulty is that borrowed eyes never have the same docility as those which are guided directly by our will. No matter how devoted a secretary may be, he wearies of a task which is infinitely monotonous to him, as he has not our interest in the subject. I do not, therefore, attempt to diminish the difficulties with which a

blind man has to contend in such work as this. They are, though, only difficulties and not insurmountable obstacles. Briefly, all that is necessary is to have a little more patience and a little more perseverance.

My chronological researches were carried out in the same way. When once the researches with regard to source and chronology were finished, the next thing was to concentrate all these results, to put them together and condense them, in order to draw from them the conclusions that they contained, and to show up, by means of the light emanaing from them, the evolution of Montaigne's thought. It was then only a matter of reflection, which is the most agreeable task of all, as no more books were necessary and no outside help. It was now only work for the mind.

For the slow maturing of all this, the Braille cards were the necessary and all-sufficing alimentation, and I have already said how easy the handling of these cards was to me. As regards this, I do not think the blind man suffers any inferiority, and the more his faculty of concentration is exercised, the more easy is his task.

Next came the work of compiling. So many blind men have published, and are constantly publishing, articles and works that have attracted attention, that I have nothing very new to say on that subject. The writing of a work of erudition does not present many more difficulties than that of a work of vulgarisation. It requires simply more precision. There are numbers and quantities of dates, and for these very minute care is necessary. Then there are all the notes at the foot of the various pages, references to texts and quotations to justify certain theories. Thanks to Braille notes, it is

always possible to arrive at a strict exactness without much difficulty. My three volumes are full of figures and references. As my researches and extracts had been carried out methodically, and the results taken down very exactly with all the necessary indications as I went on, it was easy for me to supply the accompanying scientific data which my assertions required.

As to the material part of the work, that is the actual writing down, I had the choice of two methods. I could write in Braille, in order to be able to read over my work myself and correct it, or write it on the type-machine. I make use of both these methods, according to circumstances. When I had pages that were specially delicate to handle, pages that required great precision, it seemed to me preferable to make a rough copy in relief, so that I might think it over at leisure. For easier parts, I preferred writing directly on the type-machine.

It may seem surprising that the blind should not always prefer writing a rough copy in Braille. As a matter of fact this has very real drawbacks. In the first place, in spite of the numerous abbreviations used, writing, by this method, is rather slow. It also requires a certain expenditure of physical forces. These two causes are sufficient to check the spontaneity of the mind, detach the attention from the effort of composition and turn it towards the details of the material execution of the work in hand. Certain blind men, I know, are not much troubled by these inconveniences, but there are others, and I am among these, who are keenly sensitive to them.

Type-writing, on the contrary, is rapid and easy. It accompanies thought, without checking it, and one is scarcely conscious of its extremely supple mechanism. To a person who can see, it probably seems

almost inconceivable that we can write without being able to read over the sentences just written. My experience has been that habit conquers this difficulty. As far as I am concerned it has conquered quite easily. The reason has, perhaps, been the special care given to a methodical and rather stiff composition, a method suitable, though, for works of erudition.

When one has a well-formed plan in one's mind, a plan that has been thought out in all its details, if the memory is clear, one does not lose the thread of the development. It is only very rarely that I have recourse to other eyes for getting back on to my road, or for recalling to my mind the form which I gave to a previous phrase. Very frequently I stop writing in the midst of the development of my subject. I leave the sheet of paper in the machine and sometimes, after forty-eight hours or even more, I take up my idea, without any hesitation, where I had left it. Besides, I have always the right of correcting my work. When written, I have it read and re-read as many times as necessary, and I then dictate to my secretary modifications and additions which are sometimes very numerous, as I touch up the details of my copy endlessly.

I do not think my writing any less imperfect when my rough copy is in Braille. On the contrary, although it may, perhaps, be rather more decided, it is more stiff.

To sum up briefly, the publication of these closely written pages, of 1250 in number, did not cost a blind man the prodigious effort that one might imagine. Their long preparation, and the work of documentation which served as a foundation certainly presented difficulties, but I have said enough to prove that the methods of work which are at present

at the service of the blind make it possible for such work to be undertaken boldly. I was able, by them, to work on exactly the lines which anyone wishing to treat the same subject with precision would have been obliged to follow. For in all this, I invented nothing. A man who was not blind would, I suppose, have made use of a similar card system for his notes as the one I used. I did nothing but adapt the common method, I might even say the necessary method, to the special conditions required by the blind. And that adaptation was extremely simple and demanded no great effort of the imagination. It all came about gradually, according to my needs, I felt my way as I went along. Everything sprang, as it were, out of circumstances.

My object in giving all these details is not, as can readily be imagined, to induce the blind to undertake works of erudition. In order to succeed in these, one must have a taste and a veritable passion for erudition and, very fortunately, few persons are affected by this malady. Very fortunately, too, there are other kinds of work more accessible to the blind, and in which they have less difficulty in competing with those who can see. In all that I have said then, it is not an example that should be sought. It is merely an experience that will not surprise the blind, as they will at once see how simple it all was. My methods, however, may suggest to them a few useful observations, with regard to certain applications, that they might make in their own methods of work.

My writing is addressed more particularly to those who can see. My experience, together with many others that they might meet with every day, may, perhaps, help them to form more equitable judgments concerning the blind. It requires very, very

many proofs and facts constantly given, in order to wage war against an established prejudice, and in order to make that give way gradually to the truth. We shall never have enough of these facts and proofs.

The ego (with the exception of the ego of Montaigne) is nearly always detestable. Of that, I am quite aware, My reader will observe though that, in spite of appearances to the contrary, I have really spoken much less of my own special work than of that of the blind in general. I merely wished, by means of an example given, to show the great ease and possibilities of our methods of work. Perhaps, after reading my book, our gratitude to the inventor of an alphabet to which we owe the liberation of our intelligence, will be understood.

## SECOND PART

# THE SUBSTITUTION OF THE SENSES AND THE ACTIVITY OF THE BLIND

## Chapter IV

## THE SUBSTITUTION OF SENSES, ITS NATURE AND WORKING

### I

If the intelligence of the blind man is not lessened by his infirmity, his capacity for acting is greatly lessened. Man is essentially a visual creature. Take away from him his eyesight, and you take from him his principal instrument of action. A dog which becomes blind continues to lead his normal life. His sense of smell and his sense of hearing suffice for his ordinary needs. Blindness is not rare in the canine species. We have all of us known poor dogs which, as they grew old, gradually lost their eyesight. Their infirmity is scarcely noticeable. Such dogs continue to go about, to hunt, to keep their sheep or cattle in order, to bite the legs of those which get out of rank, and to run about with all the agility that their muscles allow. It is the same with the horse, at least with the domestic horse. It will continue its regular work when it

has lost its sight. The bat, after becoming blind, will provide itself with food. Man, because he has a much less keen sense of smell than many of the animals, and especially because his activity is much more rich and varied, is more at a loss than most of the animals, when he becomes blind.

It is not that the blind man cannot take up many occupations which, at first, appear to be impossible for him. Nature seems to do its utmost to repair the harm it has wrought. As we know, the principle of this reparation lies in the substitution of the senses; the senses which have remained intact make up for the absent sense of sight, in some of its functions. But what is the nature of thîs substition and how does it work? Those who can see answer these two questions, frequently, in a very erroneous way. It is thanks to this that there are so many wrong statements made with regard to the blind. The public, therefore, has great difficulty in forming an exact opinion, in knowing the means of action of the blind, and in according to those who ask for work the confidence that they deserve.

The most common of the legends about the blind is the one which affirms that they distinguish colours by the touch. Mere common sense suffices to show the absurdity of this idea. The touch cannot give information with regard to light and colour, which are the domain of the optic nerve. Neither can the touch serve to distinguish perfumes. If the blind are able to knit with wool of different colours and to distinguish the wools from each other, so that they can use them in the right way, it is not by the colour that they distinguish them, but by some difference that they can feel, by the sense of touch, a difference in the thickness, smoothness, closeness, stiffness etc. If they speak of their wool as red, black or white, it is

because they are adopting the language of those who are with them, in order to be understood by them.

There is nothing more in the legend than this, and yet it is constantly repeated. Diderot did not venture to criticise it when he was told about a blind person who could tell the colour of stuff by touching it. M. Kunz, Director of the Blind Institution of Illzach, in Alsace, writes as follows : « I read in a school book that a blind man was the usual tailor of a certain king, because he made the best clothes and chose the colours best. He had learned to distinguish the most delicate differences of shade by the touch. » He also gives another instance : « A well-known savant said, in my presence, that he knew a blind person who distinguished colours by the touch.» It was all in vain that M. Kunz endeavoured to discuss this point with the savant in question. The only result of his argument was to bring discredit on to his school in which so necessary a science was not taught.

Father Regnault, in his *Entretiens physiques*, undertakes to furnish a scientific explanation of this faculty of the blind, the existence of which it does not seem possible to him to doubt, and he refers his readers to the *Journal des Savants*.

I take the following lines from a book which was considered an authority last century : Garniers' *Treaty of the faculties of the mind*. « A blind organist, » says Bayle, « was very clever in his profession and he could also distinguish between all sorts of coins and of colours. He played cards and won a great deal, especially when it was his turn to deal, as he knew, by touching the cards, what he gave to each player. Aldrovand says that a certain Jean Ganibasius de Volterre, a clever sculptor, became blind at the age of twenty. Ten years later, he

thought he would try to see if he could do anything in his former profession. He felt carefully a marble statue representing Cosme I., Grand Duke of Tuscany, and then made one in clay, so like Cosme that everyone was amazed. The Grand Duke Ferdinand sent this sculptor to Rome, where he made a clay statue exactly like Urban VIII. »

Abercrombie, in his celebrated *Researches concerning the Intellectual Faculties*, and Taine, in his treaty *De l'Intelligence*, repeat, after Diderot, that « Saunderson, the blind mathematician, could distinguish with his hand which were good and which were not genuine (1) of a series of Roman medals.» We are also told that « two blind men could tell the names of several tame pigeons with which they amused themselves in a small garden, by hearing them fly about over their heads. »

Without attempting the delicate task of endeavouring to find out how much truth is contained in each of the above examples, it is enough for us to consider the authorities which give them to us, in order to see that great uncertainty predominates with regard to the faculties of the blind. Those who enjoy this fantastic kind of psychology will enjoy the book published last century by James Wilson : *Biography of the Blind.* It is a collection of the amazing legends which have been circulated on these subjects. We see the miracles accomplished by hearing and touch, when the loss of eyesight has given to these senses a magical power. We find blind men acting as coachmen; others who, by

(1) Their idea, and also that of Diderot, was that it was by the design of the medal and not by the polish of the outlines that Saunderson judged their authenticity « and yet », adds Diderot, « the imitations submitted to the examination were so perfect in appearance that they misled the most skilful connoisseurs who had their eyesight. »

hearing a horse trot, discover that the animal is blind and inform those who can see of this fact. These stories have not been submitted to criticism with its tiresome hesitations, and it is just this which makes them instructive. They do not teach us of what the senses are capable, but they certainly show us of what man's credulity and imagination are capable.

In all these legends and in certain allegations received too readily by psychologists, we see the remains of a belief still firmly rooted among certain primitive nations. Their surprise at seeing certain blind men at work, and participating in ordinary life, led to attributing to them supernatural faculties. In Ancient Greece, not only Homer, who knew the destinies of the gods, but also Tiresias and most of the diviners with him were blind. In Corea, the blind are still greatly respected, because they are supposed to have the gift of second sight. They earn their living and very amply, we are told, by revealing to unhappy mortals the mysteries of their destinies. In exchange for the view of space, a view of the future has been granted to them, and this is infinitely more valuable. They sometimes develop this natural faculty in schools, where they are taught the practices of magic art. They are employed in exorcising souls and in healing the sick. In Turkey, they are more particularly utilised for reciting the Koran. They repeat it without understanding it, and their prayers are supposed to be more agreeable to the Divinity than those of other men. They are, therefore, greatly in demand for funerals and for all religious ceremonies. In Russia, there is a very popular saying that it is God who teaches the blind and that it is more particularly in them that his works are manifested.

In civilised countries, it is no longer believed that

the blind have the gift of divination or any special influence with the celestial powers, but it is still believed that the senses of the blind are miraculously acute. How are we to conciliate these exaggerations with the exaggerations to the contrary of those (and they are legion) who consider the blind as absolutely impotent. Such people have dull minds. So many facts have been proved during the last hundred and twenty-five years that the blind have been taught methodically; there have been so many excellent blind musicians and many skilful blind workmen, but all this has never convinced such individuals. If they meet with a clever blind man, they are at first astonished, they consider him as a phenomenon, class him as quite apart from his fellows and then very soon they even forget their surprise. They will always treat the blind man as a strange being who can only enjoy a very restricted kind of life. They consider him, in fact, as a paralysed being who is almost anæsthetised. They will always see in him, to the end of their days, a sort of useless and superfluous piece of furniture.

Only an exact idea of the substitution of the senses, and of the effects that can thus be produced, can influence in any way these erroneous opinions, the two extremes of which are equally unjust and baneful. Unbounded admiration is just as harmful to blind workers as contemptuous pity. Both are the results of the same ignorance. They both have the effect of keeping the blind man apart from other men. As long as an exact knowledge of his means of action, and the results that can be normally obtained from them, is not substituted for confused ideas, the blind man will continue to suffer as an individual who is not understood among his fellow-beings.

## 2

It is readily believed that the surviving senses of the blind are more acute than those of people who can see, and that these senses are capable of perceiving fainter excitants than those of other people. It is thus that the substitution of the senses has been generally interpreted. Several psychologists have defended this point of view, which is almost universally admitted. M. Griesbach and M. Kunz have made thousands of observations with regard to this subject. They have come to the conclusion that this general opinion is erroneous. (1)

(1). Griesbach's articles are to be found in Pflüger's Archiv, vol. LXXIV, pages 577 to 638; vol. LXXV, pages 365 to 426, and 523 to 573, under the title: *Vergleichende Untersuchungen über die Sinneschärfe Blinder und Sehender*. The following are the chief conclusions, according to *L'Année psychologique*, vol. VI, page 518:

1st. The power of distinction for tactile impressions is the same, when at rest, with the blind as with those who see. The difference of perceptivity is rather in favour of those who see;

(Secondly). With the born-blind, the tactile acuity is slightly less than with those who see; in some cases with the born-blind, all the sensibilities are defective.

(Thirdly). The blind feel less at the end of the fore-finger than those who see; there is frequently a difference with them in the perceptive power of the two fore-fingers;

(Fourthly). With the blind, a stronger excitant is required than with those who see, for provoking, especially on the hand, a distinct tactile sensation;

(Fifthly and eighthly). There is no difference between the blind and those who see, with regard to the localisation of sounds, nor to the keenness of hearing (for sounds at a distance.)

(Sixthly). The power of localising sounds varies as much with the blind as with those who see and is quite individual.

(Seventhly). Generally the binauricular localisation is more exact than the monoauricular localisation;

(Ninthly). There is no definite relation, either with the blind or those who see, between the faculty of localisation and the auditive keenness.

(Tenthly). There is no difference between the blind and those who see with regard to olfactory acuteness. »

With the help of the æsthesiometer, they have compared the touch of many blind subjects with that of those who see. (1) The æsthesiometer is a kind of compass, the points of which are placed on the spot of the skin where one wants to measure the tactile sensibility. When the points are very near to each other, they simply provoke one single sensation. They are separated until the sensations are felt separately and produce two distinct sensations. The separation of the points of the instrument measures the sensibility of the subject, and this increases in an inverse degree with the distance which separates the points. With the blind this was no less than with those who could see.

A singular thing, even, is that the forefinger of the blind, that is the reading finger and the one that is exercised the most, is less sensitive than the other fingers. Also, a given noise is not noticed by a blind person at a greater distance than by a person who sees.

The contrary opinion had so thoroughly become an axiom that, for a long time, the most conscientious experiments did not fail to verify it. Czermak, Goltz, Gaertner, Hocheisen and Stern have all, in turn, corroborated this by their observations. Our laboratory utensils think; they share our opinions and prejudices (2). The æsthesiometer has often

(1) Later on, I will give my reasons for differing from M. Griesbach's conclusions in certain details. He has, however, firmly established this truth, that the senses of the blind are not superior in acuteness to those of persons who see. M. Marcel Foucault's researches on this point confirm his opinion absolutely.

(2). According to the way in which the experiment is carried out, according to the matter of which the two points of the æsthesiometer is made, and according to their keenness, the æsthesiometric examination gives very variable results.

proclaimed the superiority of the blind as regards the skin's sense of place. Logically, this superiority with a blind person who is deaf is overwhelming. With Laura Bridgman, who was deprived of four senses, it was considered necessary to prove, and it was proved, that there was an æsthesiometric, tactile sensibility two or three times greater than that of normal persons. Unfortunately, measures have since been taken on others of the deaf-blind, and these have not confirmed those results at all. Even with Helen Keller, M. Jastrow did not consider the tactile sensibility to be remarkably superior to that of the normal person.

This is an instructive demonstration. We certainly knew that it was not enough to become blind for the acuteness of the other senses to suddenly be doubled. We knew that there was no miracle hidden under the substitution of senses, that it was not a kind of providential and miraculous compensation by which Nature repaid its victims. We considered it certain that it was due entirely to the intense exercise to which the remaining senses are submitted.

But one might think that the effect of this exercise was to render the organs sensitive to slighter impressions.

On considering the extraordinary acuteness which, in somnambulism and certain maladies, all the senses, but more particularly the hearing and the touch, are capable of acquiring, there was nothing unlikely in such a supposition. As a matter of fact this does not hold good. Although the limits of sensorial acuteness are not marked by immovable sign-posts, it does not seem as though the acquisition is made in this way. The minimum excitation necessary for provoking a tactile or auditive sensation is not any

less with a blind person than with anyone who sees(1).

We must not say, though, with M. Griesbach and M. Kunz, that it is greater. Paradox has dangerous temptations. The observation tables that they have drawn up show, in the most strangely invariable way, the sensorial inferiority of the blind. According to these tables, not only their sense of touch and of hearing, but also their sense of smell has lost its acuteness. Zwaardemaker's olfactometer consists essentially of an idia-rubber tubing which is stopped up by means of a glass tube, and which is then entirely covered by another tube of glass. When the surface of the india-rubber is entirely covered it does not allow any emanation, capable of affecting the sense of smell, to escape, but the more it is released from its sheath, the more abundant are the emanations. In order to affect the sense of smell of the blind, we are told that the india-rubber of the olfactometer must be freed rather more than for affecting the sense of smell of those who see.

We must not conclude from these observations that the power of perception is any less with the blind, and that when one loses one sense, the others have a tendency to become less keen. That would, I think, be participating in the same mistake as that of only too many psycho-physicians, when experimenting on the blind.

We cannot insist too much on the simple fact that there are blind and blind, and that if we do not distinguish between the various categories, we run the risk of making serious mistakes. Many of the blind owe their infirmity to a feeble constitution, to deep-

(1). Similar observations made on deaf-mutes by M. Ferrari seem to authorise us to generalise this conclusion, and to say that the loss of one sense does not render the other senses susceptible of being affected by slighter excitations.

rooted blemishes, such as tuberculosis, syphilis, alcoholism or to heredity, thanks to nearly-related parents. Others have lost their sight through some illness which has seriously affected the essential organs, the brain, the spine, or the entire nervous system. All of these individuals are blind, but they have other ailments than their blindness. It is not blindness which is the cause of their other infirmities. We cannot, therefore, consider that as responsible for the other weaknesses caused by these infirmities. If we really want to measure the effects of blindness, we must study them from a healthy blind person, from the blind who are *only* blind.

When M. Binet assures us that he has found, among a number of blind people, a less developed skull than the average skull among those who see, I am quite convinced that his measures are exact, but also that they prove nothing, and I do not conclude with him that blindness is a cause of cerebral degeneration. It would be necessary to find out whether his subjects were not blind because they were degenerated, and not degenerated because they were blind? Anormal cases of all kinds should be set aside, if we are to arrive at correct results. For such purposes it is of no use to take blind people chosen hap-hazard for examination. We must take the blind that an accident or a wound has deprived of sight, the traumatic blind, as they are sometimes called.

If Griesbach's tables are so unfavourable to the blind, it is because, in a mistaken attempt at scientific impartiality, no choice was made in the subjects examined. If absolute degenerates were not taken, there were semi-degenerates, incomplete beings, more or less affected by personal wretchedness or inherited defects and blemishes. This then is why the suppos-

ed inferiority of the blind, with regard to the senses, is only evident when certain cases are taken. When individuals, and not groups, are taken, a certain blind man will stand the test very well, concerning acuteness of sensation, as compared with no matter whom. That, too, Griesbach's tables prove very well. Blindness, therefore, cannot be considered responsible with regard to the point in question. It is only looking at one side of the problem to say, with M. Griesbach and M. Kunz, that when one sense disappears, the others, out of sympathy, become less keen.

3

The two theories refute each other. It certainly seems that the loss of sight has no direct influence on the keenness of the other senses. The doctrine of the delegated power of the senses which, in its latest analysis, would like us to agree that an individual endowed with only one sense might arrive at living as rich a life as normal beings, seems as little justifiable as the opposite doctrine, by virtue of which, Laura Bridgman, who had only the sense of touch, could only get from that one sense poor information.

On the other hand, blindness may place the individual in conditions favourable or unfavourable to the cultivation of this or that sense. It can only then be a question of a purely psychological order of substitution.

Many blind children are lamentably neglected by their parents. I know a little girl who, until the age of four, had scarcely left her little chair. Every morning the father and mother were obliged to go out, in order to earn the living of their

little family. The child was, therefore, tied in such a way that she should not get any knocks. They thought that in this way she was safe from harm. A sister, who was a little older, was left in charge of her. But, as can be imagined, this sister liked to enjoy herself and, while the parents were absent, she would run about the village with her little friends. In the evening, when the family met again, the child was untied and put to bed. Needless to say that, in spite of her four years, she had no notion of cleanliness and that she had not learned to use her legs and scarcely to use her hands. It is very clear that if something had not been done, her senses would have fallen into a sort of lethargy. Blindness would have been the cause, but a quite indirect cause. It had deprived the senses of this child of the opportunity of being exercised and consequently of developing. Now suppose that, instead of keeping her fastened up, she had been helped and encouraged to mix, as much as possible, with all that goes on in the world, that she had been obliged to take notice of everything, to take part in her sister's games and to do a hundred things herself. Things would then have been just the contrary, for her blindness would have compelled her to exercise, in a special way, her sense of touch and of hearing, and it would, in this manner, have helped their development.

For blindness can help the development of the sense of hearing and still more of the sense of touch. Fortunately, more often than not, blindness does help these senses to develop, instead of to become less keen. Although the sense of touch, with the blind, may not become sensitive fo feebler excitations, that does not mean that the sense does not improve. There are different ways of improvement. I do not

know whether M. Griesbach and M. Kunz have not rather overlooked this distinction. They appear to be too anxious to prove that the sense of touch with the blind is inferior to that of the person who sees. It is possible that the blind man may only perceive the same sensation when the two branches of the æsthesiometer are opened a millimetre and a half. That, however, does not prevent the blind man from getting exceptional services from his sense of touch. I am also ready to grant that his fore-finger may require the instrument to be opened still further than for his other fingers. That does not prevent that same fore-finger from feeling as many as two thousand, and even two thousand five hundred, Braille dots a minute and feeling them clearly enough to make letters, words and sentences with them, whilst the forefinger of an inexperienced person with his eyesight can scarcely distinguish the number of dots of which one single letter is composed.

The æsthesiometer gives valuable information, but it must not be made to tell more than it can tell. Psychophysics may inform us with exactitude regarding the more simple operations, but the more complex ones are apt to escape its means of investigation and its measures. When the understanding is brought to bear on the simple notions obtained by the senses, it enriches them with its own substance, it combines them with very many elements and gives to them a fresh signification and fresh possibilities. It is by the way in which they are interpreted by the understanding of the blind, that these perceptions of hearing and of touch, in substance like those of the person who sees, win the day generally over those of the latter.

An officer who sees a considerable number of men moving about in front of him notices, sometimes,

at the first glance he gives to this quantity of uniforms, an almost insignificant irregularity in the appearance of one of the soldiers. It may be that the man is short of a button, that he has not the regulation boots, or that his hair is too long. The detail has not been noticed by a person who, for the last hour, has been concentrating all his attention on the movements of the men. Has the officer keener sight then? Measure it and you will see that this is not the reason. He may even have weaker eyesight. But, thanks to a special education, his mind has learnt to put into relief among the notions of his senses, those concerning the exercise of his profession. When a white man lands in China, all the yellow men look alike to him at first. When he has been there a few days, he has learnt, by practice, to distinguish them. Is this because his eyesight has become keener?

This superiority peculiar to the blind man is, of course, quite accidental. It is due to the conditions of life under which he lives, and the person who can see can also obtain it by going through the same experience. Jean-Jacques Rousseau wanted his Emile to be as clever as a blind man in the dark, and to educate his senses up to the highest degree of perfection of which they were capable. What circumstances can do, the will-power can also do. It succeeds, though, much less easily. The whole of life, even in its very slightest details, contributes to developing the sense of touch of the blind. The person who sees would have to doom himself to a very artificial existence, in order to obtain as favourable conditions. What should we say of a man who had the use of his two eyes, and who obliged himself to only read books of the Braille system? In principle then, the person who sees could certainly obtain all the victories that the blind have obtained.

We must not fall into the error, which is too common, of seeing a kind of inheritance, which, on the death of a sister sense, all the other senses are to share. For my part, I see in this the allegory of a workshop which one of the workmen has just suddenly left. He was the most active and the most intelligent of them all; one of those superior workmen, thanks to whose initiative and enterprise everything has been gradually left to him to direct. Undoubtedly, in face of the enormous increase of work which must fall on those who are left, they might be discouraged and let themselves go, so that the output would be less and their wages reduced in consequence. If they are courageous, they can work harder and take advantage of the urgent need of them felt by their master, for improving their material situation. If their comrade, instead of leaving, had simply handed over to them part of the work which was confided to him, the result would have been the same.

As a final analysis, I would say that this faculty of interpretation which allows the tactile sensations of the blind man to make up, in a certain measure, for the visual sensations, is reduced to three essential peculiarities : the art of touch, a greater faculty of associating very varied psychical elements with tactile impressions, and a more keenly developed memory of these impressions.

4

There is a great difference between seeing and looking, between hearing and listening. There is, in the same way, touching, and feeling by the touch. The doctor feels his patient's stomach, the draper ceels his materials. But, except in a few special fases, the person who sees does not feel by touch.

He is not accustomed to ask for the information he needs from his tactile impressions, or, at least, he only asks them for a minimum of information.

The blind, on the contrary, are constantly feeling in this way, and it is from the touch that they get the various information on which their safety depends, and which guides their activity.

They ask not only for masses of knowledge which the eye gives more easily and more surely to others, but they also ask for information which it would seem as though the eye alone could supply.

It is by the warmth of the globe that the blind will judge whether the electricity has been lighted. According to the make of the wools she employs, the blind woman will distinguish her different colours, and use them accordingly in her work.

In just the opposite way, those who can see are inclined to judge by sight certain qualities which are very evident to the touch, and as regards which the touch alone is the competent judge.

Between thin paper and muslin, of the same shade, the difference is more tactile than visual, and yet it is more often by sight that those who can see distinguish them. A mere glance may tell them whether a material is rough and whether anything is hard, and even sometimes whether it is heavy or light. An effect of light and shade, visual representations, generally associated with tactile impressions of roughness or of weight, spare them the trouble of stretching out the hand to feel the object in question

This is why, even when they touch things, those who can see do not get from objects all the tactile impressions that they might obtain from them. The blind person does not perceive anything from the touch, on handling a coin, which the person who sees could not perceive in the same way. But, in

order to distinguish this coin from others of a different value, the blind person must observe the slightest tactile characteristics. The person who sees does not need to pay much attention to these, as a quick glance suffices for his information. The visual impression covers and, in a way, cancels the tactile impression.

The same phenomenon is noticeable, in a secondary degree, so to speak, with the deaf-blind. It would seem as though the substitution of the senses endeavoured to find fresh compensations for these senses. The rôle of this substitution is not to create, but to bring to light resources which are more and more concealed as we descend the ladder of infirmities. Behind sounds, and hidden by them from those who hear, this substitution of the senses discovers, for the deaf-blind, fresh tactile impressions, just as it discovers fresh ones for the blind who hear behind the objects of sight. The deaf-blind can get endless valuable indications from vibrations. By vibrations alone, they can perceive when a door opens or shuts, and that a drum is being beaten a few yards away from them. They are aware not only that a troop of soldiers is passing in the street, but also that a person is advancing towards them. By the special tread of a person on the floor, the more clever deaf-blind can even distinguish who the person is, if it be someone to whom they are accustomed.

M, Malossi, who has been blind and deaf from the age of six, is a mechanic at the Naples Blind Institution. It is according to the vibrations, perceived by him in a tactile way, that he works his machinery. By merely placing his hand on the back of the neck of one of his companions, he knows whether the latter is talking or whether he is silent, whether he

is laughing or crying. M. Guégan is absolutely deaf, but he assures me that he is sometimes aroused from his sleep by the footstep of a visitor coming into his room. He is, nevertheless, not in touch with the floor, which is perhaps rather shaky, except by means of the legs of the bed.

By touching the exterior organs of speech of the person talking, certain of the deaf-blind manage to follow a conversation.

Helen Keller, for this purpose, places her thumb on the larynx, her forefinger on the lips and her third finger on the edge of one of the nostrils. Professor Stern, when calling on her, was perfectly well understood by her, although his beard and his imperfect pronunciation of the English language were serious obstacles. Then too, several names of persons or places were mentioned in the course of their dialogue. He was present during an easy and rapid conversation, by means of the above method, between Helen Keller and one of her friends.

She knows, and distinguishes by touch, the noise of various machines and the cries of different animals, just as we do by hearing. Still more, she can distinguish different shades in the cries of the same animal. From the mewing to the purring of the cat, she perceives its different ways of expression, and her sensitive muscles do not mistake the angry bark of the dog for the glad bark of welcome.

It goes without saying that she touches musical vibrations by simply placing her hand on an instrument, a piano or a violin. This is a faculty which she shares with many others among the deaf-blind.

Direct contact with the body in vibration is not necessary. When Professor Stern called on Helen Keller, two knocks on the balustrade informed her of the presence of a visitor. During the con-

versation, she noticed the passing of a train which could be heard in the neighbourhood.

When the deaf-blind are endowed with a keen sense of smell, their need of practice makes them discern subtle shades in perfumes which may escape the blind who hear and also persons who see. As regards Helen Keller, she recognises different persons by the odour peculiar to them. It is the same with Yves Guégan and Marie Heurtin. M. Félix Thomas says of the latter : — « Her sense of smell is so subtle that by it she recognises persons before she has had time to touch them. It seems as though each individual had a special odour, a distinctive sign, just as each flower has its own perfume, and she is never mistaken in it.

If she is sent to the work-room with a message for one of her companions, she goes at once to the place where her friend is usually to be found. If she should not be there, Marie will stop, turn her head slowly and seek, whilst drawing breath, for the indication she needs. She does not often have to wait long. »

All these subtle shades of perfumes, and all these vibrations, would no doubt be perceived by the blind who hear, if the noises which fill their ears did not turn their attention and prevent them from noticing certain details. Like those who do not hear, they would distinguish their friends by the contact of their hand, if they did not find the voice a still surer guide. They must necessarily find greater resources in poor sensations which would be despised by the too rich and profligate individuals who have the use of their eyesight.

And then, by virtue of the same principle, when it is a question not of appreciating the separation of two points of a compass, but of perceiving, simultaneously, three or even more sensations, of distinguish-

ing by touch the various elements of a relief, the blind man has the advantage again over the man who sees. Professor Cesare Colucci, of Naples, has shown up this superiority clearly, by means of his experiments.

As soon as we pass from the simple sensation to more complex sensations, the rôle of intelligence intervenes and its first function is to synthetise the notions of the senses. It builds up, in this way, representations of the objects necessary for its operations. It seems to communicate to the finger its avidity to know.

At its command, you will see how the forefinger and the second finger work and co-ordinate their movements of investigation. They explore the object in every direction, in order to get an idea of the whole. They then keep to special parts, at first simply touching the surface, then pressing the object insistently, rubbing it several times, moving backwards and forwards, studying carefully the slightest relief and gliding over all its winding lines. Then, when there are dangerous or fragile objects, the movements are slower, more measured and self-controlled. It may make you tremble to see the forefinger exploring the edge of a sharp blade, but there is no risk. It has the precision of a scalpel. The eye of the painter passes with the same alternations of minute and impatient avidity over the model with which he wants to impregnate his imagination, but never does the finger of the man who sees become, to such a degree as with the blind man, the continuation of the brain.

5

The rôle of the attention then is, whilst stimulating the activity of the finger, to procure for the blind

more complex tactile sensations and, above all, to bring into full consciousness tactile sensations which usually pass undiscovered. The rôle of association is to give to these tactile sensations a rich signification.

The faculty which the blind man has of associating, in a very rich way, the various notions obtained by touch and psychical elements of every kind, is both the consequence and the principle of the avidity with which he feels all objects. It is because the finger makes its investigation with precision that the elements of knowledge furnished by it are then ready to combine with each other practically, and it is also because the mind needs tactile elements, for building up its ideas by means of associations, that the finger works so actively.

The mind of the person who sees frequently neglects the materials supplied by the touch. It is not because the rôle of the sense of touch is unimportant for their intellectual formation. Psychologists have proved to us that it is the touch which educates the sight and that we owe to it knowledge of the essential properties of bodies. But although it has a large share in the development of the intelligence, when once intelligence has arrived at maturity, its activity, generally, gets less. The information that it then obtains is relatively small and remains in the semi-obscurity of sub-consciousness. The mind draws very little from it, because it finds in the notions obtained by sight all the materials it needs for constructing its ideas.

With the blind, on the contrary, visual materials lacking, the mind collects the elements supplied by the sense of touch, makes use of them for throwing light on each other, combines them and associates them in a hundred different ways. Their most substantial aliments come to them by means of their

fingers. They cannot, therefore, afford to neglect them. If the man who sees knocks his knee against a wall, or touches his arm-chair with his hand, the visual images of his knee and of his arm-chair will spring up in his brain. He sees the colour and shape of them both. Tactile images are, therefore, not of much value to him. They only evoke visual images, those that he constantly uses. Still more, imagine him in the dark: he gets up in the night and tries to find his candlestick, which is on the table. In this instance, you say, he only has his sense of touch for guide. You are mistaken. It is still his eyesight that will help him most. The image of the table, and of all the objects around it, will immediately come to his imagination in the dark, and it will be according to that image, and to those objects, that he will co-ordinate his movements. If, with his thumb, he should touch the ink-stand, the image of the ink-stand would stand out in his vision, grouping around it the little Tanagra statuette, the blotting-book, the paper-rack and the candlestick, in the places where he saw them the evening before, and this would serve him as a most useful starting-point. With the blind man it is quite different. For him in the night it was only by representations, the elements of which were furnished by his sense of touch, that he had co-ordinated his movements. The *notions* that he owes to this sense will mass themselves together in more and more complex systems, and will form the nucleus of these systems, just as the visual notions form the nucleus of all the representations of the man who sees.

It is by this faculty of associations that what is called the miracle of reading by the blind can be explained. The reading of the blind has nothing more wonderful about it than the reading of those

who can see. The only thing is that, as we are less familiar with it, we admire it more. Undoubtedly, if each one of the dots were perceived distinctly, and in the full light of consciousness, the words would follow with strange slowness and it would require a long time to arrive at the end of one of those pages, all covered with little lumps, which look like the sheets of paper on which our silk-worms place their eggs. It is nothing of the kind, though. Neither the dots, the letters, the words, and I would almost say that not even the sentences, with all that they contain, are distinctly perceived. The mind goes straight to the sense, to the thought, which alone interests it. All rapid reading means a prodigious number of associations, thanks to which a small number of these elements suffices to suggest the word, and a small number of words to suggest the sentence. The mind draws from its own stock and supplies all that which, in this operation, remains in the darkness of the sub-consciousness.

And things are the same for the blind as for those who see. The latter, too, go straight to the sense and do not wait to perceive each one of the signs which, by the intermediary of the eyes, evoke it in the mind.

## 6

When we say that the notions of touch are combined in very many associations, it means that they hold a large place in the memory of the blind. The greater the number of the elements of consciousness to which an impression is attached, the more chances it has to live again. All that is isolated in the consciousness perishes, so that in psychical life, too, it is very true that « Union is Strength. »

We know how vague the common expression is of having a good memory. We do not have a memory, but memories, and certain psychologists say that we have as many memories as we have senses. The auditive memory and the memory of the movements of the larynx are frequently rather well developed with the blind, but the tactile memory is with them specially characteristic. There are blind people who remember, with singular exactness, the most trifling variations of the ground over which they walk, and they make great use of this for guiding themselves. The advantage gained explains both the multiplicity of the associations in which these impressions are integrated, and also their faculties of reviving.

Dr. Desruelles recently studied an interesting case of tactile memory in a young man named Fleury, who was born blind. He could not be called exactly a prodigy as a calculator, but he had remarkable aptitudes for mental arithmetic. Almost uneducated, and only of medium intelligence, showing signs of degeneration, he was only remarkable, like so many calculators of that kind, and particularly Inaudi, the most celebrated of them all, on account of this faculty of reckoning mentally. It supposes a hypertrophy of the memory. But, whilst with others, the hypertrophied memory is either the visual, the auditive or the motory-laryngeal memory, with this young blind man, it seemed as though the tactile memory, more than any other, was utilised. When reckoning, he touched the figures, just as others look at them or hear them mentioned. It was not before he had had any instruction, like Inaudi, that Fleury found out his natural talent as a calculator, but it was when he had been taught the Braille tactile figures. He pictures to himself, we are told, while he is calculating, the little cubes that are used

for these figures. He remembers the numbers better when he has read them, than when he has heard them read.

« By questioning Fleury, » says Dr. Desruelles, « we have also obtained some valuable information with regard to his memory. His strange attitude whilst calculating can only be explained by this tactile memory. He tells us that, when he is calculating, he pictures to himself the Braille apparatus, (1) composed of leaden squares, which he counts up on his fingers and, as a matter of fact, his attitude is explained by what he says. When he is making a calculation, his fingers move with extreme rapidity.

With his right hand, he holds the fingers of his left hand, one after another. One stands for hundreds, another for tens, and a third for the units. In a feverish way, his fingers move along the edge of his coat, and it is curious to see him substituting his tactile images by sensations which correspond to those he would have by touching his cubes. He does not appear to be listening, as Inaudi did when calculating. His whole attention is fixed on the movements of his fingers and on the memories awakened, or made keener, by the sensations he has on touching them. It seems, then, as though tactile images dominate during his operations and that the tactile type of memory preponderates in his case. »

Miss Helen Keller appears to present another very remarkable case of tactile memory. Being deaf and blind, she constantly uses the manual deaf alphabet. It is by the hand that she listens to conversations, that she participates in the life around her, and that

(1). It is evidently the apparatus called the *cubarithm*, which is not Braille's. It belongs to M. Oury, M. Matteï and to M. Emile Martin. The figures are represented by means of small cubes.

most of her ideas have come to her. « When a passage of her books interests her, » we are told, « or when she specially wishes to remember it, she repeats it quickly on the fingers of her right hand.

Sometimes even, this play of the fingers is unconscious with her. She is simply talking to herself by means of the manual alphabet. Frequently, when she is walking about in the hall or the verandah, one sees her hands given up to a startling pantomime, and the rapid movement of her fingers is like a fluttering of birds' wings ».

This peculiarity is also to be found with her teacher, who has got into a habit of constantly talking to her.

« Miss Sullivan, » we are told, « declares that she and her pupil remember *in their fingers* what they have said. »

As in the case of Fleury, we have an example here of a very powerful, as well as of an exceptional, tactile memory.

## 7

All that we have just said with regard to touch, we might repeat for the sense of hearing, and we may remark that concerning this, things take place in just the same way. We shall see the blind man observing and utilising, for the purpose of guiding himself, sonorous impressions that the person who sees may also hear, but of which he takes no notice. We shall see these impressions, thanks to many associations, supplying the blind man with information which the person who sees usually obtains by sight. For instance, in order to judge of the dimensions of a room, the blind man will listen to the sound of his feet on the floor and their echo on the walls. The person who sees has undoubtedyl

noticed that noises sound very different in the open a r or in a well. It does not require a great effort of imagination to understand that, between these two extremes, there must exist an uninterrupted scale of sonorities which, by scarcely noticeable variations, go from one to the other. But the man who sees has had no need to observe the various sonorities and their relation to the dimensions of the shut up places in which they are to be heard, because immediately, and without any effort, his eye measures the horizon. He does not, therefore, notice these sonorities.

For hearing, as for touch, progress is incontestably due to the same principle, to the activity of the mind which interprets, registers and organises, with the most perfect economy, the sensorial notions. This is how substitution of the senses is to be understood. The function of the mind is to unify the elements supplied to it by the senses, to co-ordinate them and to synthetise them for the purpose of action. Eager for action, it breathes in from all windows opened to it, the aliment on which it lives, and demands imperiously, from all the senses, the materials which it requires. Under the domination of the senses, it nevertheless governs them, when necessary, and transforms them for its own use. Our perceptions, which appear to us to come exclusively from outside, are, as a matter of fact, largely constructed by the mind.

« To perceive », says M. Bergson, « is, in the end, merely an opportunity of remembering. » The element which comes to us from outside is, immediately, submerged by a rush of recollections, and it is this rush which gives all its signification to the sensation.

With the man who sees, whose eyes are always

open, all these reserves of consciousness which animate and vivify external impressions are visual images; and from outside, visual impressions only, as a rule, have the force to evoke them in quantities. The tactile sensations arouse little or no echo. They remain dead, or they only just begin to live. They are only very feebly interpreted. With the blind man whose eyes are closed, the mind builds, in a tactile way, all the substratum of consciousness and it is the tactile impressions which so thoroughly stir the cerebral mass.

These impressions receive a maximum of interpretation. They are enriched by all that the individuality has acquired.

These are two heterogeneous worlds. The man who sees, and who knows absolutely nothing of all this life of tactile impressions, often wonders what the activity of the blind man can be. It is a mystery to him. He is thoroughly persuaded that if his own eyes closed, his active life would cease and his consciousness would soon be emptied of all it had contained. How could it be otherwise, since, with him, everything is vision. It does not occur to him that the mind which keeps vigil within him would attach his life of yesterday to that of the future, and would unite the visual impressions of the past with those auditive and tactile impressions which, day by day, would become more important and, day by day, more fertile.

Even with the deaf-blind, the mind can work the miracle of a complete life. By clinging to the few organs that remain, but rich in accumulated heredities, it will draw from all this unexpected resources.

In the hypothesis which sees in the substitution of the senses a sort of compensation ordained by Nature, what a prodigious keenness the senses would

attain in individuals who have lost both sight and hearing! Facts prove that this theory does not hold good.

M. Kunz, on the other hand, believes that the loss of one sense tends to blunt those which remain. I would ask him how it is possible that so many blind persons who have become deaf, should continue to make use of their sense of smell and of their sense of touch as cleverly as before. How does it come about, too, that certain persons, deaf and blind from their earliest infancy, have, as soon as it was possible to pierce through the heavy layer of darkness in which their mind was wrapped, attained so high a degree of culture and a skill that is relatively so remarkable? To excite the vital activity, the desire to live, the necessity of moving, that is the great secret. What the senses are capable of, provided that the organs be healthy, depends on psychical energy more, perhaps, than on any other factor. Listen to Helen Keller, whose eyes are hermetically closed, whose ears are eternally silent, shut up in her prison. Listen to her when she says: « It seems to me, sometimes, that all my fibres are eyes, open to see the immense crowd of movements on this sea of life in which we plunge. »

## Chapter V

### I

### THE SENSE OF OBSTACLES

One of the most typical manifestations of this substitution of the senses is furnished by what is commonly called the sense of obstacles or, very inappropriately, as we shall see, touch at a distance. We mean by this that faculty which most blind people have of feeling, at some distance from them, the presence of objects they are passing, or against which they are just going to knock. They generally localise these sensations on their forehead, or on their temples, and only those objects which are as high as the face are, as a rule, perceived by them in this way. A blind person endowed with this faculty, when meeting with a tree on his path, instead of flinging himself on it, will stop short two or three yards from it, sometimes even further, walk round it and continue his way calmly. All who have studied the blind have mentioned this fact. It is also spoken of in « Diderot's Letter » about the blind.

It was thought that this belonged to a new order of sensations. People have spoken of the sixth sense of the blind, and this term of the sixth sense is the one most generally employed for referring to these phenomena. It is always the old conception of the substitution of the senses, that is the

springing up of a fresh faculty destined to preserve the blind from the accidents to which they are exposed by their infirmity.

To sum up briefly, if the many physiologists who, for the last ten years, have been studying the sense of obstacles, do not by any means agree with each other, and give very varied explanations, nobody at any rate, admits now the theory of sensations *sui generis*. M. Woelfflin, it is true, speaks of a special sensitiveness of the *nervus trigeminus* and of emanations from objects which have not yet been studied, but all the other observers agree in attributing these impressions to sensations already known, sensations of pressure, sensations of temperature, sensations of audition. The divergences commence when it is a question of choosing between these different orders of sensations.

We must admit, too, that the sense of obstacles is not peculiar to the blind. Its existence has been noted in a fair number of cases with people who can see. Most of them, undoubtedly, are not conscious of it. It is made up of impressions so dense that they would not be noticed without a great effort of attention. Now these are useless to the person who sees, as his eyes warn him, a long way off, of the presence of an object. For want of being used, these impressions remain uncultivated and generally unnoticed. But some persons on taking walks at night, in dense darkness, have observed in themselves, traces of these impressions more or less developed. M. Kunz has recognised them in some subjects, on covering their eyes.

M. G...., whose visual range has been greatly reduced the last few years, writes to me that when obstacles are within that visual range, their presence is revealed to him only by his sight, but that when

they are beyond his range of vision, he can guess they are there, by sensations in his forehead and temples. In this latter case, the inhibitory power of sight is shown up clearly.

We may conclude then that, here too, there is nothing new as regards the blind except the utilisation of physiological properties which the person who sees possesses, but neglects.

I do not conclude from this, though, with M. Kunz, that, no matter at what age one becomes blind, one has the same chance of possessing what is known as the sense of distant touch.

Such theories are exaggerations which experience confutes. There are people who become blind late in life and who have this sense, but they are relatively few in number. It is generally those who become blind when young who avoid obstacles with the greatest sureness, and who have the presentiment of them at the greatest distances.

2

Circumscribed in this way, the problem no longer appears to present great difficulties. In order to choose between the various causes proposed, between the impressions of warmth, of which Dr. Crogius speaks, the sensations of pressure which M. Kunz upholds and the sensations of audition which have M. Truschel for chief advocate, it seems as though we have only to question a few blind men and, if need be, make a few experiments, in order to verify their assertions.

But the blind whom we question hesitate and contradict themselves. If the great majority affirm that it is a case of touch at a distance, the more thoughtful ones, those who are accustomed to ob-

serve, are obliged to confess that the penomenon appears to them complex and that they do not know the cause of it. And then the experiments, always delicate in psychology when one attempts to find evidence, not of the phenomena but of their causes, meet here with a special obstacle: the sensations to be studied are extremely unstable. They change with the slightest variations of external conditions, or of the physical condition of the subject. The atmospheric state suffices for modifying them considerably. Fatigue, a headache or any preoccupation will reduce them sometimes in incredible proportions. Within two minutes of interval, I have seen the same subject perceive a plank that was being held out for him at 90 centimetres, and then not perceive it at a distance of more than 35 or 40 centimetres, without anything being changed, apparently, in the conditions of the experiment.

In spite of these difficulties, I think that we may very well believe that audition is largely responsible for this so-called distant touch. The first impression is deceptive. The blind perceive by the ear what they believe that they perceive by the skin. I do not mean that, in certain cases, a ray of warmth or the pressure of the air may not increase the auditive sensation. If the obstacle should be of a higher temperature than its surroundings, if, for instance, we have a lighted electric globe, it is evident that the heat which emanates from it would make an impression on the forehead. If after skirting a wall for some time, it suddenly comes to an end and I then cross a street coming perpendicularly on to my path, more often than not a slight current of air would blow on my face, warning me by a sensation of pressure that the obstacle is no longer there. But, as a rule, objects do not seem to give out rays of heat

that are noticeable, and the air which is compressed between the forehead and the obstacle only appears likely to make a very feeble impression on a normal skin.

I know that M. Kunz, who maintains the opposite theory, tells us that he has established his opinion after twenty thousand experiments. But we, too, have a great number of experiments to bring in opposition to his, and number in this case is not everything. The twenty thousand experiments of M. Kunz do not trouble us, because, if properly interpreted, they are not in contradiction to our proposition. M. Kunz concludes from them that distant touch is caused by skin diseases, small-pox, measles, severe scarlatina. Nearly all the persons, with their eyesight, in whom he had found this sense developed had had scarlatina, whilst, on the other hand, he had never found it with a traumatic blind person. That is all very well. Certain cutaneous affections may leave behind them a hyperæsthesia of touch in those parts of the skin usually in contact with the air. Physiologists will thank M. Kunz for having studied that question. It is of very real interest for them. But the question on which we are now specially interested is a different one. In times when very many cases of blindness were due to scarlatina and small-pox, the statements of M. Kunz would have been of considerable importance for the blind. At present, though, things are no longer the same. The problem concerning the psychology of the blind is the following one : many blind people who are only blind, and who are not burdened with the recollections of a pathological past, feel obstacles at some distance away by impressions which they localise in the face. Where do these impressions come from ?

The sensitiveness of pression is keen in the pulp of the fingers and on the lips. According to the experiments of M. Crogius, which, in that particular, are in agreement with general opinion, this sensitiveness is keener, with many subjects, on the pulp of the fingers than on the forehead. If the impressions we are now considering are really and exclusively sensations of pression, is it not strange that no blind person has yet been found capable of perceiving an object in front of his hand or near his lips? Take a blind person with the most delicate sense of touch, and let him advance, with outstretched hand, towards a wall. His most sensitive fingers will never perceive the wall, I do not say at one or two yards away, as the forehead frequently does, but even at a millimetre of distance away. The sensation only commences with direct contact. It is because, in sensation at a distance, another factor intervenes, and that factor is no other than audition.

Several observations have obliged me to come to this conclusion. The first is that if one stops the ears hermetically, the perception ceases. If a vague impression of the object subsists, the stopping up of the nostrils will cause it to cease immediately. The subject is standing up in front of me, about two yards away. I have a board of 60 centimetres long by 50 wide, fixed at the end of a long pole. I bring this towards his face, but very slowly indeed, in order that there shall be as little movement as possible in the air. At about 80 centimetres from his forehead he stops me, as he feels distinctly the presence of an object. Three times I try this experiment, and three times I obtain a very similar result.

Whilst the board is still and he perceives its presence all the time, I ask him to stop his ears and nose. All sensation immediately vanishes. I move the

object without his being in the least aware of it. I bring it slowly near to him and it knocks against his forehead before he has perceived it.

The subject does not know the room in which we are experimenting. He has never before been there and has no idea of the respective places of the pieces of furniture. I take him by the shoulders and push him towards the book-case. At 25 centimetres away from the obstacle, he stops and declares its presence. I help him to continue his way. He arrives at a recess, where he is surrounded, on three sides, by two sections of the wall meeting each other at a right angle, and by the ledge of my book-case. He feels himself surrounded by foreign bodies and it is as though a heavy veil falls over his face. Sensation is at its maximum of intensity. I ask him again to stop his ears and nose, and the veil is immediately lifted. I then draw him away backwards, and turn him round two or three times, so that he may lose the notion of place and then, with his ears and nose still stopped, I push him again into the corner where he was before. He moves forward, without having the least idea where he is going until his nose touches the wall, and still he does not know where he is. The same experiment tried on different healthy subjects has given me the same results.

Another proof is given us by the fact that the deaf-blind do not generally have the sense of obstacles. I know that M. Kunz declares that he has proved it with several subjects, (1) but I have already explained why these proofs are not decisive. Then

(1). Helen Keller, of Boston, and Eugenio Malossi, of Naples, who have been sometimes reckoned among these subjects, have both written to me, personally, that they have not the sense of obstacles.

too, Dr. Marage tells us that certain deaf persons, who do not hear musical sounds, nor yet the articulate voice, are aware of certain feeble noises, and consequently, in his opinion, if one meets with a deaf-blind person with a healthy skin, who perceives obstacles at a distance, we must not necessarily conclude that the ears have nothing to do with the perception. However it may be, whilst out of ten normal blind subjects, six or seven, on an average, have the frontal and facial impressions of which we have spoken, out of eleven deaf-blind whom I have questioned, all of them intelligent and cultured, not one of them knows these. Still better is the example of three who used to have these impressions when blind, but only before they had lost their sense of hearing. All three of them told me that their deafness had stopped the other impressions. (1). If these impressions had come from touch, it would seem as though they would have gone on developing. More attention would have been paid to them from the fact that their help was then all the more necessary. Many blind persons have noted that when they become rather deaf, or when they have some temporary ailment in the ear, the sense of obstacles is blunted and paralysed. I know of one blind person who, in order to remedy this increasing inconvenience, got unconsciously into the habit of making a slight, but continual, noise, by clacking his fingers, so true is it that an auditive perception is the condition of the perception of obstacles.

(1). This number of *three* seems insignificant. We must not forget though : (1st). That with certain subjects their blindness was not anterior to their deafness; (2ndly). That even with those who were blind before they were deaf, it often happens that grave and protracted affections of the auditive organs preceded the complete loss of hearing. This explains the fact that only a proportion relatively small of the deaf-blind have known the sense of obstacles.

I might also mention that when a great noise is suddenly heard, when a bell begins to ring violently, quite near, the blind person feels lost, and he no longer perceives obstacles. But this fact is, perhaps, not decisive, as the disturbance may be the result of a kind of dizziness caused by a too intense sensorial excitement. On the other hand, how are we to explain that a too complete silence seems to be unfavourable to the sensation of obstacles? We must remember that silence, which instead of distracting the attention can only help its work, may disturb the functions of touch. All blind people know that when the ground is covered with snow, and does not resound under their footsteps, the land-marks which guide them, usually, in their walks are lacking.

A still more strange fact is that a monotonous noise, subdued and regular, seems to develop, more than any other circumstance, the obstacle sensations. A fountain flowing peacefully at some little distance, the continual noise of carriages afar off, the crackling of a wood fire in the grate, are sometimes valuable aids. This is what permits us to guess the origin of the phenomenon. The fountain, the street traffic and the fire are permanent sources from which sonorous waves are continually escaping. These waves are arrested, turned aside or thrown back by the obstacles which, in this way, warn an exercised ear of their presence.

But, it may be said, if silence reduces the obstacle sensation it does not suppress it. What relation then has this sensation to auditive phenomena.

In the first place, absolute silence scarcely exists, perhaps. The atmosphere is peopled with indistinct sonorities, infinitely vague, which we do not perceive

directly, so accustomed are we to them. They are for us silence. In order to become at all conscious of them, the only way is, perhaps, to suppress them, or at least to diminish them and so render them perceptible by the contrast. Dr. Imbert has made this very clear. Let us choose, as he did, as a subject for our experiments, a person who can see and who has never had the least suspicion that he possessed, in any degree whatever, the sensation of obstacles, but whose impressions are subtle and whose faculty of observation is keen. We will then bandage this person's eyes, in order to intercept the light completely. And then alternately, and at irregular intervals of time, we lift a cardboard box of medium thickness above his head and then we lower it to from 10 to 15 centimetres below his ears. The room in which we are trying this experiment is perfectly quiet. The subject does not fail to tell us of each of our movements. He knows very well when the box is opposite his ear. If the sensation ceases, we have only to bring the obstacle nearer for it to be revived. What is it that occurs? According to all appearances, the box intercepts the confused sonorities, scattered through the atmosphere. It makes the silence, which we wrongly believed to be absolute, still more complete And who does not know that there are some silences more profound than others?

## 3

Whether it be a question of intercepted waves or of reflected waves, I believe, for all these reasons, that it is the ears chiefly which give to the blind those sensations of a special order which we call obstacle

sensations. This opinion seems to agree with the results arrived at by the investigations of naturalists regarding bats. Although blind, bats guide themselves along very well in the very midst of all kinds of obstacles without knocking against them. For them, too, it has been suggested that this is due to a mysterious sense which perceives certain emanations coming from objects. But it has been proved that, by stopping their ears hermetically, bats are rendered incapable of guiding themselves, so that it appears, at present, that the sixth sense claimed for them is simply the sense of hearing. The peculiarity, though, of obstacle sensations is that, although belonging to the auditive order, they are not recognised as auditive impressions. In my opinion, M. Truschel has not sufficiently established the line of demarcation between these obstacle sensations and sensations clearly auditive, and the confusion resulting from this takes away from his demonstrations much of their probing force.

I formerly suggested that they were sensations of pression. My basis for this theory was the imperious testimony of the consciousness which usually localises them on the forehead and on the temples. I was also very much struck by the fact that if one intercepts the sensations of pression, by covering the face with a piece of stuff, the sensitiveness to the obstacles disappears just as when one intercepts the auditive and olfactory sensations. The objection no longer seems to me unanswerable. In the first place, it is not always like this; then, and above all, we must not forget that by covering the face, a strong sensation of contact is produced, which affects profoundly the sensorial state of the subject. Since the obstacle sensation is localised on the face, it is natural that, vague and fleeting as it is, it would be

stifled by a facial sensation so distinct and so compelling. (1).

The experiments and observations which I have just given reduce considerably, in my opinion, the rôle which I attributed to sensations of pression. I do not go so far as to say that they have eliminated all participation of these sensations in the phenomena which we are studying. I merely say that in all normal subjects that I have been able to study, the auditive element was considerably the most preponderant; that with them the sensation of pression, if it existed, was so restricted, that, unless out in the open air, it was not utilisable alone. In the open air, even with quite normal subjects, the rôle of the sensations of pression appears incontestable. We all of us feel that the atmosphere causes in us impressions that are slightly different, according to whether we are in an enclosed, shut up place, or in a wide, open space. Those who see have noticed that their cutaneous sensations are different in a thick forest and in a field. It is likely, *a priori*, that something of this difference subsists when, in a large room, we pass from the centre to the outer wall. Then too, it is likely that certain specially intense cutaneous impressions, the existence of which M. Kunz has observed in abnormal subjects, have not been created entirely by illness, but that, in a normal state, impressions corresponding to them, but so fleeting that they did not reach the consciousness, were there, and that they became excessively developed by certain affections of the skin. In healthy subjects, such impressions might undoubtedly be of variable intensity. More often than not, they would not have

(1). Experiments which I have tried on healthy subjects by painting their faces with a solution of cocaine gave no appreciable result.

been noticed if impressions of another kind had not strengthened and amplified them, and generally these other impressions are auditive ones, but they might also be impressions of quite a different kind.

I spoke some time ago of eleven deaf-blind subjects whom I had questioned. I have now to add the testimony of a twelfth subject, and this one has the sense of obstacles. He is completely deaf, so that no indication can come to him through the ear. For M. Yves Guégan, the olfactory sensations play the rôle usually taken by the auditive sensations. His sense of smell is very subtle. On the 24th of last May, he wrote to me as follows : « This morning, from the window of my room, I smelt the odour of the postman's bag and knew that he had arrived at the flat under mine. » I do not conclude from this that deafness had developed the olfactory sense of my subject, for, on a warm day, the smell of leather is very penetrating, but I admire the art with which he uses this sense. Although he, too, localises in his forehead the sensations that warn him of the presence of obstacles, it is thanks to his olfactory impressions, it appears, that M. Guégan notices them. Every time that a cold in the head deprives him of his sense of smell, he is incapable of finding his way about. At my request, he tried an experiment.

« I had the table and chairs taken out of the dining-room, » he told me, « and then, so that the test should not be spoilt by the effects of my muscular memory, which is extremely exact, I let one of my friends carry me about the room on his back, turn round in every way and then put me down in different parts of the room. Every time I guessed exactly where I was, and I could tell my approximate distance

from a certain piece of furniture or from the wall. I tried the same experiment, after stopping my nose carefully. I could not tell then where I was at all, and I knocked my head against the lamp hanging from the ceiling in the middle of the room. A window was then opened for me and, thanks to the contact with fresh air, I could once more find my way. »

M. Guégan's case is unique within my knowledge, but of course that does not mean that it is unique in reality.

It would be risky to draw any conclusion from it until similar observations have been made. If we venture to interpret the experiment, it would seem to show that the sense of smell may, exceptionally, play the same part as hearing in the obstacle sensation, a rôle which, perhaps, consists of intensifying tactile impressions that are too feeble to be utilisable alone.

This is only a fragile hypothesis. At any rate, the experiment of this deaf-blind subject, so exceptionally endowed, instead of weakening our theory, seems rather to corroborate it. (1).

Even if the very probable existence of a dull sensation of pression were admitted, we are still not able to explain suffieiently how the obstacle sensation, which, in principle, is more particularly auditive,

(1). Marie Heurtin, the celebrated deaf-blind subject of Larnay, near Poitiers, appears to be as richly endowed as M. Guégan, with regard to the sense of smell. She assures me, though, that she is only aware of obstacles out of doors and at a short distance away. Her case is well worth studying. She writes me that with regard to obstacle sensations, which she defines as frontal and facial sensations, she is in a state of notable inferiority to her companions of Larnay who are blind, but who can hear. They are quite well aware of obstacles, even inside the convent. She says that she considers her deafness is the cause of this inferiority.

should be localised in the region of the face (1). For even those who recognise the auditive origin of it (and some of the most intelligent have already recognised this) persist in maintaining this localisation.

The testimony of all the blind on this point is indisputable. With some of them, the region affected seems to be specially the temple, whilst with others it is the forehead, (2).

The localisation is, however, so decided, that many blind persons refuse to admit the hypothesis of an illusion. And yet the illusion appears clearly in an experiment like the following: I place the plank, of which we have already spoken, at 70 centimetres from my forehead. I have no sensation of it at all. It is all in vain that I concentrate my attention. I do not perceive anything. I let my first finger slide over my thumb so that my fingers make a slight noise. Immediately the obstacle sensation invades the whole surface of my forehead. The auditive surroundings alone have been changed; the cause of the sensation can only be of an auditive

(1). I wrote previously « in the skin of the face », but this is an important slip which I wish to rectify. It is not a question of a cutaneous sensation similar to that which contact with an object gives. Asked to describe clearly their impression, most of the blind have answered that it is not the skin of the forehead or of the temple, which is affected, but the frontal part of the head, and they own that is is impossible to indicate any determined spots.

(2). M. Kunz has remarked that most of the blind present their forehead to the obstacle that they are trying to locate exactly, and he has drawn conclusions from this in favour of his theory. M. Truschel, no doubt influenced by his theory, which seeks in the auditive impressions the cause of obstacle sensations, maintains, on the contrary, that as a general rule, it is rather the side of the head that the blind turn in the direction of the object in question. My personal observations agree rather with those of M. Kunz on this point, but I do not draw the same conclusions that he does. It is, perhaps, in order that both ears may participate in the sensations that the blind man is unconsciously inclined to turn his full face towards the object.

order, and yet the sensation appears exclusively tactile. If, on the contrary, I move my fingers without making any noise, no sensation is perceived.

Physiologists will, perhaps, some day account to us for this phenomenon (1).

(1). It is quite understood that I do not attempt to explain it. I only wish to make two remarks which may, perhaps, make it appear less strange.

The first is that the localisation of auditive impressions lends itself to many illusions. M. Urbantschinsch (Pflügers Archiv, 1904, vol. 101, page 154) has observed, for instance, that when one conducts a sound to the two ears at the same time, by means of acoustic tubes, the sound is not localised in the two ears, but it generally forms what he calls « a subjective auditive field », located in the middle of the head. He has noticed besides, that when the sound is shrill, the subjective, auditive field moves in the direction of the forehead, whilst when the sound is deeper, a change of place in the opposite directions occurs, that is toward the back of the head. This, perhaps, helps us to imagine the localisation of impressions, of an auditive order, in the frontal region.

My second remark is that the impressions in question are, in normal life, void of all practical utility, and this is why they are so completely neglected by those who can see. As a rule they are not even aware of them. The impressions are only useful in cases of blindness. The blind man does not ask for any objective information from them, he does not ask for any information about the things around him. The impressions only interest him from a subjective point of view, in so far as they can preserve his forehead and his face from the knocks which threaten them. That finality of obstacle impressions, which alone gives them their existence, may favorise close associations between them and frontal and facial sensations. These would, in a way, give their form to those. Two circumstances favour, perhaps, this theory. First, that we have not been able to completely eliminate the hypothesis of subconscious sensations of pression, which auditive sensations might strengthen and bring into full consciousness; and then this other point, that the obstacle sensation tends to being accompanied by a representation of the object and by an enlarged representation. This extension of the object is even, perhaps, its essential quality as it measures the danger incurred by the face and suggests the way to avoid it.

Now the extended representation, suggested only by auditive impressions and incapable of fusioning with these, harmonises very well, on the other hand, with the frontal and facial impressions, extended as they are. It is projected, in a way, on the part of the body interested.

We already know that the localisation of sensations is one of the most complex psychological acts. It supposes an interpretation of the sensation and reasoning and is liable to many mistakes. Everyone knows that a man who has been amputated localises his suffering at the extremity of the limb that he no longer has. It seems as though, in the case that we are considering, the sensation is attributed to the region which would have to suffer from the obstacle, if its presence were not pointed out. Many noises provoke in us strange sensations. A saw grating against stone gives us shivers in the back, or sets our teeth on edge. Every sensation is capable of producing in the organism different effects, and may arouse in it sub-sensations very different in their nature from itself.

## Chapter VI

# THE FACULTY OF ORIENTATION

### I

Substitution of the sense of sight by that of touch and of hearing, and obstacle sensation, which is, apparently, only a pecular application of the substitution of the sense of hearing, these then are the chief means which the blind man has for guiding himself in space. There is, however, still a third means and that is muscular memory. These three guides enable the blind to find their way about in the places they usually frequent and, sometimes, to the great stupefaction of those who are watching them for the first time.

Any blind man in good health ought to move about easily and safely in dwellings which are familiar to him. He ought also to accustom himself very quickly to fresh houses. If his hearing is perfect, and if he has been trained at a fairly early age, he can go about in a village, and even in those districts of large towns where the traffic is not intense.

Do not, however, let us exaggerate. Some boasters, and they exist, too, among the blind, would like to make us believe that, without being given any starting point, they cross the Place de la Concorde alone. There are, undoubtedly, some who are exceptionally clever in this way, and also some who

are exceptionally daring. But a remarkable feat, the success of which depends more on luck than on the skill of the one who performs it, has never proved anything. As, in such attempts, a human life is at stake, there are, in reality, very few blind persons who care to take the risk. The blind who enjoy telling how they go about in dangerous parts often forget to mention that they get someone to help them at difficult crossings.

When rid of such extravagances and brought down to its real level, the aptitude of the blind man in getting about has nothing mysterious about it. It is infinitely less surprising, and indeed it bears no comparison with that faculty of orientation which we see in the carrier-pigeons and migratory birds.

Science hesitates with regard to these creatures. The question is whether they have a special sense, which has its seat in the semi-circular canals of the ear, and its exciting principle in terrestrial magnetism, or if everything is explained by a more perfect utilisation of the ordinary faculties of animal intelligence: sight, memory, smell, hearing and touch.

In the case of the blind person, this second explanation, which would also hold good for the pigeon, is incontestably the right one. Analysis renders account of all its elements. Every observing person who can see can recognise in himself the germs of these faculties, if he studies patiently his own impressions when he goes about in the dark. They are hidden from him, usually, by the visual image he has of the places which he traverses. For the blind man, there is simply a more complete grasping of fugitive impressions by the consciousness, and this has the effect of amplifying and particularly of co-ordinating them, and of interpreting them in view of action.

Substitution of the senses, obstacle sensation and muscular memory are combined in very variable proportions, according to the individuals, in the faculty of orientation.

2

There is a tendency, generally, to exaggerate the importance of the obstacle sensation (1). It only gives extremely poor indications with regard to the objects. It never tells anything as to their nature, and all the experiments made with a view of distinguishing wood from glass, or from different metals, have always been complete failures. Then, too, it is constantly mistaken as regards the distance of the objects from the subject. It only tells of their presence, their orientation and their extent, but simply their extent in width and not in height or in thickness. It does not give this immediately. In order to measure it, one has to move about in front of the object, and so prove where the veiled impression begins to be felt, and where it ceases.

One of the sections of the wall in my study is taken up by two open book-cases, separated from each other by a closed one. I take one of our subjects by the hand and let him walk past these pieces of furniture, keeping at a distance of about half a yard from them. Although the door of the closed book-case only stands out about four inches more than the backs of the volumes on the shelves of the open book-case, he tells me, at once, that the wall is not uniform and that he perceives

(1) According to M. Truschel, for instance, a blind person's faculty of guiding himself is almost entirely due to the sense of obstacles. This erroneous idea, in my opinion, detracts greatly from the practical value of the advice that he gives

different reliefs. He has not the least idea what the pieces of furniture are; he only knows that there are pieces of furniture there. I describe them to him briefly, and then ask him to point out to me the exact spot where each of them commences. We begin our walk again and, after a few steps, he stops short. « The veil is getting thicker, » he says, « after the bare wall the first book-case now begins, jutting out considerably. »

We then move on a few steps. « The veil is thicker again, » he says, « If there is not an empty space in the rows of books which is confusing me, then the closed book-case begins here. » I ask him to indicate the spot still more exactly. He goes a step to the right and a step to the left, bends his head and brings his forehead exactly opposite the space of about two inches left between the two pieces of furniture. At the other end, there was the same success and the same precision.

The veil slackened twice. This subject, therefore, had a distinct consciousness of the extent of each piece of furniture.

This observation shows us very clearly the use which the blind man can make of the obstacle sensation. On entering a room which is unknown to him, it allows him to follow its outlines and to measure its dimensions. It can also spare him a few knocks, but for that he must move along cautiously, as it requires a great deal more attention to perceive unknown obstacles than those which memory has pointed out to the senses. The obstacle sensation only gives very vague information to the blind man as to the topography of a room, or as to the furniture which it contains. In order to get a clear idea of all this, he must either touch everything or have everything described to him.

On the other hand, in a house which he knows, it wil help him to guide himself, by means of the obstacles with which he meets, and it will give him the sensation of the presence of the objects around him. Thanks to it, he will go along by a wall, separated from him by a fair-sized flower-bed, without touching it, and yet almost believing that he is touching it. He will count the doors and windows in it, provided that these doors and windows recede a few inches from the wall. He will distinguish the chief variations, the gulfs and promontories, as it were, to be found there. As he goes along a road, he will count the trees which border it, and will soon know whether to turn after the fifth or tenth, in order to take another road. The sense of obstacles thus supplies landmarks for the blind on their path through life.

3

Another category of landmarks, quite as numerous, is supplied by the tactile, olfactory and auditive impressions that the blind man may collect from his surroundings. It is, this time, a question of distinctly auditive sensations. In an enclosed place, the sound of his footsteps and voice will give to the blind man indications which, although of course vague, serve for telling him the distance he is from the walls. They will also tell him whether a room is carpeted and furnished, or not.

These noises which he makes himself have the advantage of being always at his disposal, but, on the other hand, they have a serious drawback. As they move about with him, he cannot situate them at any

fixed point. Sounds which emanate from fixed sources are much more valuable to him, especially when they are permanent and not noisy. A blind man on entering a room, for the first time, which has windows opening on to the street does not fail to notice this detail. The noises which come from outside will tell him exactly, from henceforth, where the window is, and where, consequently, are the doors and the pieces of furniture that he classed according to the position of that window. The striking of the clock, its ticking, if loud enough, the crackling of fire in the grate, a door closing on the landing, or footsteps outside the room and many other things will render him a similar service. And do not let us forget that all these familiar noises may cease to be perceived distinctly, as it always happens with familiar sounds, and yet they will continue to play their rôle as indicators. The twilight of the subconsciousness suffices for that.

Perfumes frequently disperse in too subtle a way in the atmosphere for their source to be always localised easily — and distinctly. They are, therefore less serviceable. The seent of roses which I inhale, seated at my writing-table, does not tell me on which side the roses are, nor, consequently, on which chimney-piece they have been placed. To find that out, I should have to move about and observe whether the intensity of the sensation increases or decreases. The odours from outside, which come through the window from the garden, and through the door from the kitchen, are not to be despised.

Noises and perfumes are often lacking, but tactile impressions scarcely ever fail the blind. They are the most constant of all. There are some which come from the face. It is by the face that the direc-

tion of the wind and the position of the sun are perceived. These landmarks are the only ones which a blind man has for guiding himself on an esplanade where there are no obstacles, and where the ground is uniform.

From the foot he learns much more. He remarks that the nature of the ground changes, that, instead of the path, there is a lawn, that there is wet sand instead of dry sand and asphalt instead of paving stones. He notes and registers the declivities of the soil, its slopes, ruggedness and lumps of every kind, and these trifling variations are numberless to an observer. When one has to step on or off a foot-path, this can nearly always be guessed by a slight giving way of the earth under one's feet. Even in houses, where the floors are relatively even, trifling defects or peculiarities are not lacking and, if the floor itself does not often vary in nature, carpets, mats, oilcloth, and rugs of all kinds supply endless indications. Setting one's foot on the edge of a carpet suffices often for at once placing every one of the objects contained in the room. A curtain or door-hangings, touched merely by the elbow, will give indications in the same way. By placing one's finger lightly on the corner of a table, on the arm of a chair, or on any other piece of furniture which is in its regular place, (and in a well ordered house nearly all the pieces of furniture have their regular place) the mind of the blind man at once sees a picture of the whole room. To anyone who knows the table, the position of its surface, and of its four sides, is indicated by the position of one of its corners. From the position of the table one knows the position of the walls of the room, and from the position of the walls, the normal position of each piece of furniture is deduced.

4

Muscular memory works in another way. Its method is not to supply landmarks. It does not work by deduction. Its effects are to fix movements by the habit of linking those movements together, thus rendering orientation mechanical, as it were.

Everyone can recognise in himself traces of muscular memory. It is by it that, without counting the steps and without looking at them, we know that we have reached the top of our staircase. Our legs have registered, in a way, the number of contractions they had to make. Not only can this muscular memory retain very well the height of a staircase, but also the dimensions of a room and the distance between two walls. It instigates the blind man to repeat, with perfect regularity, the movements that have become habitual to him.

One of the most striking examples of what muscular memory can do is to be seen in ordinary writing. To write a sentence is a very complex piece of work. It requires a considerable number of movements, each one of which must be very exact. We know what difficulty a child has, and what persevering work is necessary before that child succeeds in writing easily. These same movements, when once the muscular memory has registered them, become so easy to a man, and he can execute them so rapidly, that he can write for hours without fatigue, and at an amazing rate. Supposing that he suddenly loses his eyesight. By making use of a very simple hand-guide, he can continue writing as in the past, but without the control of the eyesight. The hand's memory will suffice for ensuring the legibleness. One condition only is necessary for this, and that is

that he must not stop writing, he must not interrupt his activity for a few years, so that his muscles may not lose the impress of an acquired habit. The muscles of the legs and feet retain the memory of movements they execute, just like the muscles of the fingers and hands.

Muscular memory seems to be more particularly developed in creatures of instinct. On seeing the ease with which certain blind dogs, still young, move about among obstacles, the sureness with which they mount and descend staircases which they know, one imagines, and not without reason, that it must guide and command their movements. It is also frequently remarkable among savages. When, instead of trusting to its instinctive suggestions, one co-ordinates all one's movements, by means of exterior signs perceived by the consciousness, it gradually becomes disaggregated and finally loses its certainty. Sight, which supplies so many landmarks, and so easily, is peculiarly fatal to it, so that among civilised persons who see, its rôle seems to be considerably reduced. Subjects of the visual type, and their number is legion, believe that they must see their limbs, in order to move them with agility, that they must measure their gestures with the eye, and guide their hands by watching them.

Among the blind, and especially among those who became blind at an early age and whose childhood was not neglected, there seem to be more of those who move about easily and their muscular memory is less benumbed. Even with them, the habit of interpreting the impressions of all kinds that they receive, of guiding themselves by means of obstacles perceived at a distance and, sometimes, of counting their footsteps, tends to reduce its rôle.

The more faithful the muscular memory of the

blind, the more easy and sure are their gestures for reaching certain objects and the more free and firm their gait.

The rôle of muscular memory, the importance of which is very variable according to individuals, is very difficult to judge, but it is principally evident among the deaf-blind. For even the deaf-blind are not entirely without resources for guiding themselves about. If they are deprived of auditive sensations, and nearly always of obstacle sensations, there remain for them at least olfactory and tactile impressions and, above all, muscular memory.

We have seen all the help which M. Guégan gets from odours. For him many pieces of furniture have characteristic odours which allow him to distunguish them from each other, and so to guide himself. We have also seen that his tactile organs perceive many phenomena which we can scarcely perceive in any other way than through the hearing. « I never cross a street », he wrote to me, « without standing still a few seconds to make sure that no carriage is coming, as I can guess that from the vibrations of the ground under my feet. From the vibrations, I obtain a whole crowd of indications; I feel them so distinctly that they give me the illusion of hearing. »

It is, though, more particularly by the degree of fidelity of the muscular memory that the faculty of guiding themselves varies with the deaf-blind, and it varies from one subject to another still more so than with the blind who hear. Those who are richly endowed with this essential faculty move about the house quickly and easily. They do not require to touch the objects which surround them and they only knock against them when their attention is wavering. Marie Heurtin moves about, without

any hesitation, in all parts of the Larnay convent where she lives. But if one of her companions should join her and distract her attention whilst she is walking, and so interfere with the inner working of her muscular memory, she feels lost at once.

There are even deaf-blind persons who venture out alone for short journeys. M. Guégan, of Brest, is in the habit of going alone from his own house to the house of one of his friends. He has to cross the St. Saviour Place, in the middle of which is a Square surrounded by a low wall, with openings only at its four corners. Guided by his muscular memory, he makes straight for one of the gates and never knocks against the pillars on each side of it. He walks across this Square, a distance of about 70 yards, and goes out by another gate. He stands still at the edge of Church Street, to make sure that it is safe, crosses it and then takes an adjacent one, Ramparts Street. He walks along this one quickly, without even taking the foot-path, and stops exactly in front of his friend's door. In the country, at a place he had known before losing his eyesight, he used, when young, to venture about alone and without a stick, walking in the middle of the road. The increase of traffic obliges him now to be more prudent. He now keeps to the edge of the road and only goes short distances alone. We are told of a deaf-blind man at Osnabrück, who goes alone every day to his workshop, in the centre of the town, and returns to his home in the suburbs.

## 5

If it is thus with some of the deaf-blind, we need no longer be astonished on meeting with cases of great skill among the blind who hear. I would

warn people, however, against exaggerations. On reading the list that we have just given of the resources upon which the blind person can count for guiding himself about, the reader might become unduly optimistic. He may imagine that all the blind, so rich in landmarks, can get about without difficulty among obstacles. We have shown the mechanism of these means of action under conditions favourable to the working of the same, but they are, nevertheless, fragile, and we must not forget that they are often partially paralysed by circumstances.

In reality, one meets with obstacles that are often too low down to be noticed. Then too, the attention may waver just at a dangerous moment when one is in the midst of obstacles which are moving quickly, (busy people, for instance, or cycles) and sometimes obstacles which cannot be heard. We must also remember the loud noises inevitable in towns, noises which overpower the obstacle sensation and blunt impressions of all kinds. Noises are hushed in the night and, on this account, I have known blind persons who wanted to acquaint themselves with a fresh road in Paris, choose for their expedition the hours when the great city is drowsy. There, in the darkness, the blind find their means of action once more. They can take note, leisurely, of the changes in the ground and of the obstacles which can serve them as landmarks, so that the following day they are all the stronger for venturing through the bustle and noise of the street. These difficulties will explain how necessary it is for the blind to commence such exercise when young and to continue perseveringly, if they wish to develop their faculty of guiding themselves, and so be able to move about freely, or relatively so, in a town. Even those, and they are by far the greater number, whose ambition is limit-

ed to moving about, with perfect ease, in large buildings and of getting used, without difficulty, to fresh ones, must be on guard constantly against enemies which beset them all the time. The first of these enemies is a timidity very common to the blind. It comes from self-respect like all shyness, from an exaggerated anxiety not to betray one's blindness by any awkwardness, and this timidity paralyses the movements to an extraordinary degree. Another enemy is the laziness of the ear and also any affections of the hearing, no matter how slight, as these drawbacks result, without fail, in a diminution of skill in moving about. The worst enemies of all are, perhaps, a too sedentary life, and an abuse of mental work, the ordinary effect of which is to make the movements heavy, the limbs hesitating and awkward, and to weaken the muscular memory.

## Chapter VII

# GYMNASTICS AND GAMES

### I

It will be understood, from what we have just said, how valuable a good physical education is to the blind, and how essential it is for them to maintain the agility of the body by means of regular exercise. In order to perform the simplest actions of every-day life, in order even to find one's way about, when the movements of one's limbs are not guided and helped, as it were, by the eyesight, an excellent motory apparatus is necessary and the motory apparatus of the blind runs exceptional risks.

The blind child is often lively, turbulent and petulant, just like children of the same age who can see. It is by no means rare for him to play and move about in an excitable way. Only too frequently, though, does this natural vivacity get calmed down early in life. The child becomes a man before his age. His limbs become heavy. Games, and even physical exercises, will lose their charm. Frequently, by the wish of his parents, who have the best intentions, the boy's childhood becomes sedentary. His parents do not wish him to run any risk, and they see risks for him everywhere. His muscles do not develop on account of lack of exercise. His movements are uncertain and appear

to be aimless. His way of holding himself is awkward and pitiful. His health is often affected and his intelligence, too, by being imprisoned in an enfeebled body.

The physical development of the blind child is, on an average, very inferior to that of an individual of the same age who sees. This inferiority is both with regard to strength and to agility. Mr Allen, Director of the Blind Institution of Boston, has observed that his pupils are below the normal weight and height, and the dimensions of their thoracic cage are also below the average for their age. Light is perhaps an aliment for the nervous system; at any rate it favorises exchanges and is useful for the good working of the organs. One might wonder whether the lack of it is not injurious to the whole body. But the light in which we bathe does not penetrate by the eyes alone. All the pores of the body drink it in, in long draughts. The physical inferiorities of the blind are therefore due, principally, to the fact that, through blindness, they frequently lack physical exercises and the culture of the body. Blindness, therefore, acts as an indirect cause, the effects of which might be greatly modified.

This is why in all good special schools, an important place is given to gymnastics in the programmes, and one tries to get the pupils to play and to take as much exercise as possible. It is not only their health which is thus preserved, or improved, it is also their skill, so necessary to them in all circumstances of life and, as we shall see, in another chapter, it is also the setting in motion of their intellectual faculties. From this point of view, the English and American Institutions are far ahead of all others. From them we get examples to follow. The Royal Normal College of London, thanks to the individual

initiative of its blind Director, Mr. Campbell, has obtained a world-wide reputation, on account of the physical culture given there.

Swedish gymnastics of all kinds, (free movements and movements with halters and other special inventions) are very much recommended for the blind. For the last twenty years our hygienists have greatly appreciated them. It is a curious sight, in our schools, to see groups of girls and boys in rows, facing the master, and all moving their arms about in the same way, and at exactly the same second. The arms are raised and lowered, stretched out and bent, and all in perfect time, whilst the voices count time aloud, so that all the muscles of the thoracic cage are in play at the same moment.

At a given signal, all stop, turn quarter round and each one places his or her hand on the shoulder of the one in front. Then the whole column starts, with a gymnastic step, under the direction of someone who sees, or is only half blind, and who walks first. Thanks to this chain of arms, uniting shoulder with shoulder, each one keeps to his or her place, and the master can have the same variety of steps practised as by a column of pupils who can see.

Gymnastics for the blind are not limited to walking and limb-moving exercises. All the various accessories to be found in ordinary gymnastic schools will also be found now in the Gymnasiums for the Blind. They have the fixed bar, the parallel bars, the horizontal ladder, the beam, the rings, the trapeze, the knotted and unknotted ropes, etc. The professors of our special gymnasiums tell us that, with scarcely any exception, their blind pupils can learn the various exercises, and use the same accessories as those who can see. Anyone who would care to have further details might like to read

a book by M. Récopé, Professor of Gymnastics at the special School of the Department of the Seine. In this volume, he exposes the method followed by him for his pupils during the last eighteen years.

I must own that in France, and in Germany, these things are often neglected, or at least much less employed than they ought to be. Principals of schools are too afraid of the responsibility they incur by urging their pupils in this direction. And, as a matter of fact, public opinion, ignorant as it is with regard to a blind person and what he can do, would never forgive a broken leg or a limb out of joint. Masters would be blamed for allowing their pupils to run such risks, and so these measures of far-seeing prudence are termed imprudent (1).

The blind who take no notice of public opinion get along very well. In the Anglo-Saxon Institutions

(1) See, on this subject, Mr. Edward E, Allen's opinion : *On Physical Education in European Schools.* « The visitor » he says, « will not find that prodigality of play-grounds so common in America. He must not expect to find play-grounds as we understand them. There are always Gymnasiums, where physical exercises take place according to the best methods Workmen and working women are invited there for the sake of taking a little regular exercise, by way of rest. One often sees games of bowls outside, whilst within the precincts children play at the prescribed games, or at soldiers, with great enthusiam. There is nothing, however, like our athelic sports I asked why.» ' Oh, ' replied my host, ' the public would not approve of a Director who was quite a man of progress ' ' What does that matter to the public. ' I asked. ' I will give you an example, ' he said. ' A few years ago, I had a jumping apparatus fixed in my Gymnasium. A boy fell from it and was hurt. As the police heard of the incident, I had to appear before a magistrate and explain why I allowed anything in my Institution which was unsafe for the blind. I had the apparatus removed, as I did not care to risk being arrested. You will understand why we keep to certain games that are allowed. I suppose that you Americans are not bound in this way. ' ' I told him that I should be very sorry if we had our hands tied like that, that a blind man's life was only too monotonous, and that our methods require the spur of fresh things, fresh enthusiasm, and the inspiration of surroundings.'

where people are less timid, and where public opinion is always on the side of sports, I am told that accidents are no more numerous than in the schools of those who have their eyesight.

2

But games and various kinds of sports are often better for the blind man than gymnastic exercises. An attempt was made, at the Brussels Congress of 1902, and at the Manchester Congress of 1908, to find out what the blind man could do in this way. All the games and exercises that were examined there, lists of which will be found in the reports of these two Congresses, have been tried and proved. Many of them are excellent, as they serve to develop all the faculties of the blind and, at the same time, that substitution of the senses, which is the keystone of their activity.

When the blind man holds in his hand his fixed bar, or his smooth rope, he is the equal of the man who sees. He only needs force and agility. Sight is not necessary to him for the exercises that he has to perform, and he has no need to draw upon his other senses instead of sight.

Dancing has the advantage of developing, besides his agility, his muscular memory, and it will develop this much more than most gymnastic exercises. It is practised in many of the special schools in France, Germany and England. Very varied dances can be executed by the blind. Many of them dance heavily and ungracefully, but others with great ease, so that it is pleasant to watch them. In order to regulate these movements, it seems that those who have never seen can only guide themselves slightly

by spatial representations of the human body. They require a very keen inner consciousness of their muscular images, and an extremely well developed memory of these same images. The more they improve that consciousness and that memory, the more easy will it be for them to distinguish clearly between the attitudes and movements which the teacher praises and the attitudes and movements which he blames; to retain the image of the former, in order to reproduce them, and to improve them by constant retouches. Every exercise of skill requires work of this kind. But in this case a considerable number of muscles are brought into play at the same time, and this is why dancing gives more exactness and assurance to the movements, and why it also improves many of the ungracious looking countenances so common to the blind.

But in order to run and jump about out-doors, the blind do not only need to have force, agility and precision in their movements. They must also draw upon all the resources of their senses. They have to use them in circumstances exceptionally difficult. They develop them by means of the most powerful stimulants which can excite physical activity: individual initiative, emulation, the ardour of the game and the need of acting promptly. This is why games and sports are so beneficial to the blind person. They help to encourage a certain spontaneousness in the midst of material obstacles which have a tendency to stifle that spontaneousness.

The difficulty of these exercises is by no means so great as those who have their eyesight imagine when watching the blind at their athletic sports. People are surprised, for instance, on seeing a blind man on a cycle, a tandem cycle, of course. We must remember that his part is a passive one, or rather

that his activity is limited to working the pedals together with his companion. This kind of sport is, therefore, accessible to the most awkward.

Many of our piano-tuners, living in towns, go on their rounds in the country on a bicycle, or tricycle, accompanied by a child who serves as guide. In our schools, we use trains with six or nine places, and pupils who are by no means clever at physical exercises delight in taking long rides. The only case in which the blind cyclist has to give proof of skill is when there is an accident. If the chain of the machine should give way during a descent, he must be able to jump off in spite of the speed and, in case there should be traffic on the road, he must make use of all his senses, in order to jump where he should, and as he should. It depends chiefly on luck.

I have met with a great many cases of this kind and have generally found that luck has hitherto managed things very well, so that it deserves our confidence for the future.

The risk is rather greater with the horse, another exercise which people seem surprised to see blind persons attempting. As a matter of fact, their rôle is almost as passive there as with the cycle. All the credit of success in exercise of this kind is with the animal, and not with the rider. Sometimes the blind man simply accompanies another rider, whom his mount is accustomed to following. Frequently, too, he trusts to the intelligence of his horse, which avoids obstacles both for his master's sake and for his own, and knows how to manage for the space necessary for the leg against his body, so that it may not knock against the objects it passes.

« It is not really necessary to have a companion, » Mr. Littlewood, the Principal of a School for the Blind at Liverpool, told us. « I know a blind man »,

he continued, « who rides regularly in the streets of Bangor. Then, too, Mr. Mines, a member of our Committee, went to Hale and back, on horseback, a distance of sixteen miles, for our annual picnic. »

In a case of this kind, it is evident that the rider's initiative is much greater. All his powers of perception must be at full tension, in order to recognise the places along which he is going, in such a way as to be able to give the horse a few very simple indications. When the blind man is content to merely follow a guide, or to ride about in an enclosure, without any special object in view, on a horse that is gentle, and that has been well trained, such exercise is so simple that even the deaf-blind venture on it, and also on tandem-riding and swimming. Helen Keller delights in all these three sports.

As regards swimming, the difficulty which seems as though it might impede a deaf-blind person is that of orientation.

M. Yves Guégan assures me that he manages very well by taking, as his landmarks, the position of the sun and the direction of the wind. The blind who can hear, have, besides these two guides, the sounds at the water's edge which help them still more. The swimming bath is very much in favour at the Royal Normal College. Those in authority have so much confidence in the advantage to be obtained by the pupils from this sport that they now let them practise rescue work. They are quite right in this, as the following extract from a letter proves. It is from Mr. Siddal, a former pupil of Worcester College. « I remember two cases of rescue from drowning, » he says, « performed by pupils of Worcester College. I think, even, that there were three cases in my time. I know that one man saved two lives in the Severn, and another

man prevented a youth from being drowned in a ditch. »

The English are also fond of boating, mountain climbing and skating, and all these sports have their blind partisans. I might add jumping of all kinds, with the legs joined, or apart, as in leap-frog. All these games are very profitable, most certainly, each in its own way. The psychologist will learn more, though, by watching games that require more skill, those in which one has to run, or to aim straight.

If the blind are to run without any danger, they must have tracks made of grass, sand or asphalt, and all obstacles must be carefully removed. If the runner should get out of the right course, his foot, not being on the track, would immediately warn him, and he would gradually learn to follow the straight line. The track frequently skirts a wall at some little distance away, and the presence of this wall will be felt by the blind man, by means of his sense of obstacles. In order to keep clear of the other runners, the blind man listens to the sound of their foot-steps, or still better, the sound of the bells on their arm-bands, worn for this very purpose. Thus all the various senses of self-preservation are on the watch at the same time. Nothing could possibly prepare the blind better than all this for their various tasks. In this way many kinds of races can be tried, races in sacks, and with the feet tied, races carrying eggs, and also with roller-skates.

The arm-band with bells is specially necessary for games such as prisoner's base, where the aim is to catch or avoid the adversary. In these games, the ear plays an important part, and the sudden and perpetual change of direction that is necessary is a most profitable exercise of adaptation. All the muscles of the body must obey, with the greatest

rapidity possible, the information given by the sense of hearing. At the game of blind-man's buff, the blind are excellent players, simply because with them movements depend on the hearing and touch. The blind boy plays with others who are blind, but he also plays this game with those who can see. His companions are apt to exclude him from their other games, as he is less skilful than they are, but they fetch him for blind-man's buff, and the game is never as amusing as when it is his turn to catch the others.

Games of nine-pins, ball, and foot-ball require, in varied proportion, skill or agility. They all have this common feature, though, that while the body has to hold itself in readiness, the discipline of the muscles is of the first importance, the exact adaptation of the movements to spatial conditions which are known by means of hearing or of touch. It is by the touch or by the hearing that the object in view is attained.

The set of nine-pins is placed on a raised board, and the player finds out the position of the nine-pins aimed at by the position of the board and the direction of its edges, which he feels with his hand. In order to make the game quite practical, a special arrangement must be made, in order to prevent the nine-pins and the ball from rolling too far away, so that it will not take the players too long to find them. Raised edges keep the ball within bounds; at the end of its course it falls on a sloping board placed just beyond, and this slope brings it slowly back to the player. As to the nine-pins, they are tied to the board, in a way that prevents them from rolling farther than within a limited space.

For games at ball, the place aimed at may be made sonorous in various ways, one of which is by means

of an arrangement similar to that in our alarums. The object or aim of the movements is the ball itself, which the player is constantly obliged to pick up. In the inside of it, a sonorous object can be placed, a small rattle for instance, or, as was suggested at the Manchester Congress, a handful of dried peas, which make plenty of noise. Of course, when the ball is up in the air, the things inside are silent, but when it rolls on the ground or bounces, they can be heard. The rules for such games must, therefore, be adapted to the conditions necessary for playing by ear, instead of by sight. Modified in this way, they are in great favour in certain institutions. Tennis also has been adapted to the requirements of the blind, (1) and Mr. Siddall assures us that he gets as much pleasure out of it, and also out of hockey, as any player who can see, and that no other exercise is as profitable to him. He would like to see these two games in favour in all the special schools.

« Cricket, » says Mr. Illingworth, « is the sport most in favour at the Henshaw Blind Asylum. The boys play cricket before breakfast in the morning and all the spare time they have during the day. When they are not occupied with their studies in the morning, you will find them at cricket, and in the evening they play it until bed-time. » (2)

(1). The net is raised a few inches and the game is then to make the ball pass underneath it. It is a fault each time that it bounces on the net, or that it passes over it. It is a fault also if it *dies*, that is if it stops, so that the little rattle inside can no longer be heard. The other rules are very much the same as for ordinary tennis. Needless to say a special racket is used.

(2). Certain modifications are necessary for both these games. For hockey, the club has been replaced by a less dangerous one, and, instead of playing on grass, hard ground is preferred, as the ball can be heard better. Boundaries are made of borders of wood or stone, which reach from one end to the other of the hockey ground.

In all these games of skill the blind person is at a great disadvantage, when playing with anyone who sees. Sound carries less quickly nearly a million times than light, and the localisation in space is much less exact by hearing than by sight. Therefore movements directed by sound, for the purpose of reaching objects placed at some distance away, can never lay claim to the same sureness as those directed by sight.

It is none the less interesting, though, from a psychological point of view, to know that the substitution of the senses will permit certain blind persons to play at these various games so well that they can enjoy them. At the Perkins Institution of Boston, football matches continue with great animation for whole days. At Worcester College, during the fine weather when tennis was played, partners would continue until they were absolutely exhausted.

## 3

It is by way of preparation for practical difficulties, of every kind, which the blind meet with in everyday life that these games and exercises are of the greatest interest. Unfortunately, in France, most of our blind turn away from them. Very many have a positive dislike to physical education of any kind, and it is, of course, those who need it the most who are the laziest about it.

The awkward ones are legion. Since, even in France, the blind of an active type do without it, and since the example of the Anglo-Saxons proves to us that it is possible to develop the active qualities in a much greater number of the blind, we see the importance of making greater efforts in that direction.

Our inferiority, in this respect, is not only a question of race. I think that our school system is largely responsible. Besides the timidity of the directors, which I have already mentioned, I would also point out the almost total absence of infant schools for the blind. It is during their very earliest years, at the time when their natural vivacity urges them on, and when they are not paralysed by an excessive prudence, that the blind ought to form the habit of movement. When this time has passed by, it is usually too late. Our Institutions which take pupils at the age of 9 or 10, or even when they are older, find, only too often, that the harm is already done.

At the Braille School, the only blind infant school that we have had up to the present, the gymnastic teaching has given as good results as in any foreign institution, and the master who organised this teaching gives the following account of the result of his experiment : « Very much more so than with children who see, we had here to begin at the very beginning. The blind child has to be taught to use its limbs and, above all, to be prevented from falling in to the habit of timidly keeping still, which is as harmful to the health of the body as to the development of the intelligence. The children who are brought to us are sad and shy. The movements of their joints are lacking in elasticity and suppleness. They walk in a hesitating way. The first thing is to give them assurance and teach them to be at ease when moving about. By preparatory exercises, we have to teach them how to get the full benefit of the lessons that follow. It is very rare if, at the end of a certain time, the very slowest of them cannot take part in exercises which are gradually more difficult, so that finally, on watching them, one would scarcely know whether they are blind children or whether they see.

We have proved the perfection at which it is possible to arrive, in the class exercises, by patience and very careful attention. »

When there is no blind school rationally organised to which one can send a child, it is of the greatest importance that the child's parents should encourage it to run about, even at a certain little risk, and that its brothers and sisters, or friends, should encourage the child to play with them and to take part in their various exploits. Its whole life will be transformed by this. There is no serious physical education, even for those who can see, without certain risks. Even supposing that the risks the blind run should be greater than those of persons who can see, the advantages that the blind get from physical education are incomparably superior to those of the others, and quite out of all proportion to the danger to which it exposes them.

All blind persons who have had the good fortune to have had a lively childhood, even with a certain amount of danger, congratulate themselves on the fact later on.

Mr. Campbell, who was born in the United States, lost his eyesight at the age of three and a half. He is eloquent always when he speaks of the first years of his blindness.

« I was passionately fond of hunting and fishing » he says. « With my brothers, I used to climb the steepest rocks. I became in this way a practised climber. One day, when we were very far from home, we decided to leave the beaten path and to go by way of a rocky mountain, hanging on to the branches of trees. I could climb any tree by clasping the trunk tightly in my arms. My most dreaded enemies, in the adventurous excursions of my youthful days, were serpents of all kinds. I often

touched them with my feet without knowing it. One day, during the harvest, a huge rattle-snake happened to be in the corn that I picked up. It moved quickly in order to escape and I, feeling the movement, flung it as far as I could and thus, probably, saved my life... I was very fond of all the animals around us on the farm. I loved our horses. A little mare, named Nelly, was my special property. She was very lively, but no reasonable being could have better understood my blindness. She came at my call and I could always trust myself to her. Even along the mountain paths, she would carry me safely by the most dangerous routes. »

Certainly, rattle-snakes are not necessary for a good education for the blind, but in the exploits of this turbulent childhood, we see the source of that prodigious energy of which Mr. Campbell has given valuable proofs in his adventurous life. He made the ascent of Mont Blanc, accompanied by his son and a guide. This was a luxurious satisfaction to him. I should even say it was a kind of parade, if I did not know the great joy that Mr. Campbell has in exercising his physical activity. He has also gone on horseback, with a companion, some thousands of miles, among the mountains and plains of North America, in search of blind children with no means of education. Caught in a storm and overtaken by darkness, he had to be the guide of his leader and, helped by his intelligent mare, he saved them both from disagreeable consequences. It is to his bold expeditions that a good number of blind children owe their education. There is another consequence, less picturesque but quite as estimable, because all blind persons can follow his example. It is the fact that it is to his own childhood, the memory of which is so dear to him, that he owes his skill

in the actions of everyday life, and only those who have lived near him know the price he paid for that skill. He owed to it a green old age, most active and most useful, for, at the age of eighty-two, Mr. Campbell was at the head of the Royal Normal College, and so persuaded was he of the advantages he obtained by his wandering expeditions, that he became the champion and apostle of physical educa tion for the blind.

## Chapter VIII

# INDICATIONS CONCERNING THE PHYSICAL ACTIVITY OF THE BLIND

### I

The study of the faculty of orientation offers us an example of the way in which the substitution of the senses works with the blind. In order to measure all the effects of this substitution, there are two investigations to undertake.

The first of these investigations concerns the usual occupations of the blind, such for instance as the toilette, sweeping, plain cooking etc.; then the manual trades they generally take up, such as the tuning of pianos, brush and basket-making, straw-plaiting and re-seating of chairs, boot-making and mending, the manufacture of brooms etc. For each of these occupations or trades, it is necessary to follow all the manipulations of the blind man in every technical detail, and to notice in what ways these differ from those of the persons who see and how, in every special case, he makes up for the lack of eyesight. In this way, one would learn the usual effects of the substitution of the senses in all normal cases.

The other investigation would have for its object that of finding the more rare effects, the limits of possibilities with a few individuals exceptionally endowed. For this, one would have to choose sub-

jects remarkable on account of some special aptitude, and one would then study, with extreme care, the various means of action. There is a blind electrician, for instance, another blind man is a knife manufacturer, and another has worked as a carpenter and cabinet-maker in several workshops with those who see, and exactly in the same conditions as his fellow-workmen. It would be very profitable to find out how these men accomplish their respective tasks.

The profit would, perhaps, be as practical as it would intellectual. A certain aptitude, which seems to us to be individual, might, perhaps, become not common, but less special, and on examining it closely we might find that many subjects might make it their own.

But in order to arrive at this result, we should have to begin at the beginning. It is not that accounts and descriptions of such special cases are lacking, but there are none, or at least only a very few, which we could accept without thoroughly verifying them. As regards ordinary occupations, each blind person can give us information. There are manuals for blind piano-tuners, brush and shoemakers, but as regards special capacities, there are always mystifications. Either the individual in question tries to make the most of himself, or an astonished on-looker is loud in his unintelligent admiration. In such descriptions there is, usually, no precision. If you try to go to the root of it all, in nine cases out of ten, you will see the miracle vanish before your eyes. One point has, perhaps, been forgotten, the blind man has not mentioned that he was helped by a man who could see at a critical point, and the most simple act, therefore, at once became a miracle. To obtain the

perfect sincerity of witnesses is not the only difficulty in similar investigations. One must also be thoroughly competent in many different ways, if one is to follow the carpenter, the knife manufacturer and the electrician, each one in the technical detail of his speciality. This is what makes such investigations difficult. They are, however, necessary. We shall not know the real force of the substitution of the senses if we only know the more ordinary forms of it. If we really wish to know the situation of the blind, and the physical condition which their blindness causes, we must know the limits of their own faculty of acting. Both studies are then desirable, as they complete each other.

We cannot attempt to undertake these investigations in the pages which follow in this volume. I am only giving a few facts which may serve to direct the researches of those who undertake them and which, by showing what the blind can do, will prepare the imagination and give a more exact idea of the substitution of the senses.

2

For his intellectual life, we have seen the blind man constitute for himself a very special set of tools, and we have seen that he could only develop his activity by giving up the instruments used by those who can see, and by having others made for himself. These other instruments are absolutely distinct, very suitable to his needs and adapted to the requirements of the sense of touch.

We might fear that, for the material life, in the same way, special and artificial surroundings might be necessary, that he might be obliged to transform everything for his use, to create, in order to live and

work conveniently, a special set of tools, adapted to the requirements of the sense of touch. This is not necessary. The substitution of the senses is supple enough only to necessitate a minimum of special requirements. The objects the blind man regularly uses are very much the same as those used by everyone.

The reason is that most of the indispensable instruments for the material life of those who can see, because they serve for material ends, are alike for the sense of touch and sight. A pail, a jug, a basin and a plate are utilised for tangible purposes. The touch, which is the fundamental sense from which all the others are derived, is the sense *par excellence* for the preservation of life. It is mingled with all the essential acts. Many objects which we use, are, as appears so clearly in the case of the spoon and fork, only appendages and substitutes for the hand, the faculties of which they increase and improve, just as the hand is only the most perfect form under which the tactile organs are presented to us. They remain then in contact with the hand and borrow from it all their value.

Although those who can see represent these objects to themselves visually, and deem the sight of them indispensable for using them, the rôle of sight with regard to them, although undoubtedly very valuable, appears to be merely accessory. It allows the persons to come into contact with them at a considerable distance, but in imperfect contact, which would only very imperfectly replace direct contact. A person who can see, for instance, obtains no essential service from a fork except when he holds it in his hand. Sight serves specially for rendering the handling of objects more sure and more rapid.

It very rarely modifies, in any great way, the connection between us and objects of the first necessity.

I say objects of the first necessity, because, as civilisation develops, it constantly creates fresh needs. It invents instruments more and more artificial for satisfying these needs. The less necessary and simple these objects are, the greater the tendency to escape from touch, which is the most utilitarian of the senses, and to appeal to the other senses. The tools of every day-life become, in consequence, more complex day by day, and their relations to touch which were, at first, so close, become less and less close.

I do not mean that in all cases in which the eye only plays the part of an aid, the art of touch suffices for substituting it without the help of any special instrument. (1) The slightest touch will displace the pieces in a game of draughts. The blind man can touch them carefully, and so get a clear idea of the position of the two adversaries without disturbing the game. This constant preoccupation would make the game much more slow and tiring though. The blind man, therefore, plays with a set of draughts which, instead of being simply placed on their respective squares, are held there by means of a kind of pin which fits into a corresponding cavity. This is the same for other games, for chess and loto, for instance.

The extreme tenuity of certain objects may be an

(1). In a general way, in tools and instruments of work of all kinds : hammer, pincers, chisel, broom, tongs etc. the blind man tries to get a handle as short as possible. In that way, he can guide them more surely, and the muscular impressions that he obtains from his work are most valuable to him. These muscular impressions help him to control what he is doing, and in cases in which he cannot touch without danger, or serious inconvenience, they constitue even his sole means of control.

obstacle for the substitution of the senses as much as their extreme mobility. Skilful blind persons can thread needles, even very fine ones, by using the point of their tongue. It is to their advantage, nevertheless, to use needles which have the eye split at the end, needles for the blind, as they are called, but which are also used by old people who have not lost their eyesight.

These are exceptional cases, for extreme tenuity and extreme mobility constitute impediments in everyday life even for those who can see and are, consequently, avoided by them as much as possible. Many objects which, either on account of their temperature or for the danger they may cause, or perhaps on account of their fragility, are considered by those who are not blind as only possible to employ when they can see them, can be used quite well by the blind.

Certainly heat causes difficulties for the blind and yet, in their homes, we see them attending to the fire, without making use of any special instruments. They prepare the fire, light it and keep it going. The crackling of the flame and the radiation of the heat often supply them with useful indications. They use gas for warming themselves, or for their cooking. There is no necessity to make spirit lamps of any special shape for the blind; they can quite well use the ordinary ones that they find in the shops. The only thing is to choose the least dangerous ones. They cannot, of course, touch the log that is burning in the grate with their finger, in order to see whether it is nearly consumed. Touching it indirectly will settle this difficulty. By feeling the end of it with the tongs, the blind man can find out the position of the burning log and also its state. When it is a question of boiling water,

the ear will always tell him the moment of ebullition.

He is compelled to be more cautious with regard to fire than those who can see, and he has to pay more attention to it in consequence. But nothing in our houses is dangerous for him to use. Any pointed or sharp object can be left in his hands. He can manipulate the axe and the saw as well as the sharpest of knives and the keenest of drills. Thanks to the special education of his sense of touch, which allows him to guide and measure his movements with a precision to which the man who can see only attains with his eyes open, he can use the regular instruments for cutting or drilling.

Thanks also to this education, fragile or extremely mobile objects are generally quite safe in his hands. In order to tell the time, he raises the glass of his watch and touches the most delicate fingers without any risk of moving them.

A boarding-school mistress wanted a very fragile glass moved to another place. « Give it to the blind boy », she said, « it will be safer in his hands than in those of the other children. » That was a paradox that I will not attempt to defend. It expresses this truth, that an excess of risk sometimes develops an excess of attention which may become habitual. We have seen, for instance, that the blind man is able to move about the house without ever knocking against anything. He can, therefore, use the most fragile objects and he regularly carries full jugs or lighted lamps, without any danger.

The most perfect art of touch is sometimes at a loss, though, concerning objects which those who see only use for the sake of their visible qualities. The blind man frequently finds a way of utilising even these, because the visible signs and the tangible signs have the common characteristic of being spa-

tial, so that the visible signs are accompanied by tangible signs which, being superfluous for the person who sees are not even noticed by him, whilst the blind man will at once make use of them. There is, for instance, the current coin of all countries. The dominoes and dice of the blind are the same for everyone.

Very often the utilisation of objects would not be possible if the visible signs were not translated into tangible or auditive signs. The arrangements that the substitution of the senses requires are very few and, generally, extremely simple.

Card games, of which the blind are passionately fond, are only possible to them when the cards have been prepared for them.

They are marked with little dots at each end, symmetrically placed, so that the blind man can take the card up either way. The dots are so small that they do not inconvenience the players who can see. For draughts, the pieces have not only to be fixed to the board, but the black ones must be distinguished by the fingers from the white ones. A dot, for instance, can be put on the former. The face of the blind man's watch has the Braille figures, or else tangible signs which can be added to the ordinary visual signs, a precaution which is really not necessary, but which helps the fingers to read the time more exactly. By means of very simple adjustments, the blind man can read his thermometer, barometer or even hygrometer. Yard measures are also furnished with tangible signs, and also the scales which the blind man uses. Letter-scales have been invented with special auditive signs, marking the weight corresponding to fixed postages rates. Many of these inventions are so little necessary that the blind do not use them.

These objects can be increased in number, but it is of no use supplying those which are only for ornament and intended to please the eye. Such objects are incapable of tactile translation. Necessary objects are all capable of this.

If we go from the house to the workshop, the blind man would feel much more lost. Most of the industrial machines that our refined civilisation now invents are so complicated, so dangerous, or require such precision in manipulating, that they are practically out of the question for the blind. Objects in the house are handled not by specialists, but by everyone. They are only practical when they can be used easily and without danger. The latest presents which human industry has given to our houses, the lift, the telephone and the type-writing machine can all be used perfectly well by the blind. The phonograph, for instance, seems to have been specially invented for them, so that they, too, can keep the portraits of persons who are dear to them, auditive portraits. These will give to the blind the same emotion that the photographs, in his album, will give to the man who sees.

If we take the blind man into the house of a man who sees, a fair number of objects, most of them objects of luxury for the pleasure of the eyes, will be lost on him. In the drawing-room, if fragile gimcracks abound, he will feel awkward and constrained, on account of the extreme attention he must pay to his every movement. But when once he has learnt the place of everything, a work of memory which is indispensable for him, he will have all that is necessary for living and moving about.

And if now we take him back to his own house, we shall scarcely notice that the master of the house is deprived of the most valuable of all the senses.

A few blind persons, exceptionally awkward, have felt the need of having certain transformations made in their home for their special convenience. I know of one who has had wire placed along all his garden paths, so that he can guide himself by his hand. Such precautions as these, the person who sees would probably approve, but the normal blind man would only laugh at them. In his home, only his study has an extraordinary appearance, thanks to his huge white books full of dots, his map of the world in relief, and his strange writing implements, among which one looks in vain for an inkstand. In all the other rooms, in case the blind man lives alone, an attentive observer is struck by the extreme order with which every object is in its place, and by the poverty of ornamentation. At any rate, only objects of everyday use are to be found. If our attention is not specially called, we should not notice the slight peculiarities in the barometer, thermometer, cards, and games of chess and draughts.

## 3

Supplied with the same material, in the way of everyday objects, as those who see, the blind man takes up very varied occupations in his own home. I do not say that he is entirely independent of all aid. Social life is so organised that we all require aid, and the blind man more than anyone else; but all the indispensable movements are easy to him and also many that are less necessary.

In the first place, he attends to himself personally entirely. As regards his toilette and dressing, he is quite independent. A blind woman can do her own hair and a man, when he is skilful, can shave

without any help. Each article of dress, even to his necktie, he can keep in order. He is, however, defenceless as regards spots or stains on his clothes. Unfortunately, there is no sense to replace the looking-glass, so that the blind man must depend on the eye of the person who sees for knowing when there are spots or stains on his clothes.

At table, there is no excuse for him if he does not eat in an absolutely correct way. Although his shyness may prevent him from cutting his meat in the presence of strangers, he can quite well do this. Indirect touch, by means of the knife and fork, enable him to judge of the size of the pieces and, if he should be mistaken, the weight of his fork will warn him. He can even select the piece he wants on the dish, but that takes a little time. To keep food, which has a tendency to slip about when touched with a fork, on his plate, he makes use of a piece of bread with his left hand. He fills a decanter easily, knowing by the sound about how high the liquid is. For pouring the liquid into his glass, the auditive indication is frequently not sufficient, on account of the shape of the glass. The weight, however, will help him and he can also place his finger gently on the edge of the glass, so that he will feel when it is touched by the liquid. To peel or skin fruit is not at all difficult, but fish with many bones is very trying.

For household work, the aptitudes of the blind are very variable. Some blind persons do their own house-work almost entirely.

A certain blind man, who lost his sight at the age of thirty-three, did not wish to be a burden on his family and gradually took upon himself the entire work of the house. He cleaned the boots, dusted the furniture, swept and polished the floors, made the

beds, attended to the fire, sewed the buttons and even did simple darning, laid the table, washed and wiped the plates, dishes and silver. By degrees, in fact, everything was undertaken by him until, finally, he was responsible for the washing. In order that his companions in misfortune might profit by his experience, he has written down details of his methods in a little manual. The psychologist would also learn something from it. Dust can be felt and also mud, and the blind man who does house-work must not be afraid of soiling his hands and washing them. Linen that is soiled cannot always be distinguished by the fingers from clean linen, so that when the blind person washes clothes, if he has no one near, who can see, for pointing out parts that require special care, he uses more soap and wears out the linen more than a person who can see would do.

The example of this courageous blind man, which is not, by any means, a solitary case, shows us all what a blind woman can do in her home. Experience has given us, in this respect, so much hope, that on every side special schools are being asked for, so that girls may have serious house-keeping preparation. At the Janesville School in New York, such encouraging results in this way have been obtained, that the last few years there has been a great movement in this direction. Since it is recognised that the blind working-woman can only, in exceptional cases, manage to keep herself by her work, instead of making great efforts to arrive at an unattainable end, she might, through such schools, learn to render the greatest service possible in her own home and so make for herself a better position. Even the woman who is a musician would get great benefit from such teaching.

Besides all the occupations we have already men-

tioned, how many more there are which the blind woman could take up. She could arrange the kitchen utensils, grind the coffee, shell the peas, prepare the chestnuts, fold the linen and how many other things?

In the house of the Sisters of St. Paul, Rue Denfert-Rochereau, Paris, blind Sisters wash the dishes and carry the meals through many passages, up various staircases and through many doors, from the kitchen to the rooms of the lady-boarders. They clear the table afterwards, clean the furniture and the windows, sweep the stairs and help in washing the linen, which they hang out to dry without any help at all. A blind woman can dress and undress children, give them their food and do nearly everything for them that is required. I know one who has brought up, almost entirely, her three little brothers and sisters I know others who have acted as nurses, giving the medicine, preparing the warm drinks, skaking up the pillows and re-making the bed. I even know blind women who have undertaken a great part of the cooking for simple meals. They judge whether the meat is sufficiently cooked by the resistance of the fork. Ironing appears to be a risky employment for blind women, as the linen might get singed. They might, however, iron pocket-handkerchiefs. or other simple things,with a moderately hot iron' All these results, which are only rare experiments, might be generalised. There is no question of making servants of our blind women and paying them the wages of ordinary servants. Their work is neither sure enough, nor yet quick enough for that, but they might be very valuable helps in a house.

In the same measure, and always as an additional activity, and not as a trade, gardening has been taken up by some blind men. M. Yves Guégan's chief

occupation is the cultivation of flowers and vegetables. In certain schools, every pupil has his piece of ground to cultivate, and most of them do it very well. In the same schools, there are sometimes poultry farms, and I know one blind man who has made a lucrative trade for himself of this occupation. He declares that he can do all that is required himself. (1)

In America, they recommend dairy work, pig-keeping, apiculture and also mushroom and vegetable growing. A pupil of the Brantford Institution, Ontario, writes as follows about his work on his father's farm :—

« When I went home last year, in the month of June, it was rather the dead season and there was not much to do. After a few days, though, I was very busy. I got up between 5 and 6 o'clock, fetched the horses from the fields, brought them into the stable, gave them water, hay and oats. I then cleaned and harnessed them. I poured the milk into the separator and went into breakfast. After breakfast, I fed the calves, the fowl and the pigs, and then took the cows to the meadow. On certain days, I carried water to the house, made butter, or attended to the washing-machine.

Half way through the morning, I took water and a meal to the men who were working in the fields. Towards eleven o'clock, I fed the animals and then went off on horseback to call the men in to the midday meal. In the afternoon, I cut the weeds and thistles down in the enclosure, cleaned the harness and carriages, or cut wood. I was also the groom, and if the horse went out I always harnessed and un-

(1). Another blind man was spoken of at the Manchester Congress who was devoted to apiculture, but I have no details about him.

harnessed him. In the evening, the same work began again. There were the animals to feed, water to be pumped for the horses and cattle, the cows to milk, the milk to be put in the separator, and the horses to be taken out to grass. At hay-making time, I helped to make the ricks and to get the hay into the barn. During harvest, I passed the sheaves for making the ricks. When the potatoes were got up, I filled buckets with them and emptied them into sacks, which the others carried away. When the maize was cut, I helped to place it in heaps, and I also gathered the beetroot and turnips »……

« In a family », we read in *Le Louis Braille*, « the blind husband ought to help his wife, in a certain measure, quite as well as the husband who can see. In winter, he can light the fire. Whilst his wife is cooking the meal, he can go down into the cellar, fetch the bottles, uncork them, and cut the bread. If he wants to help, he will find many things to do in the house. There are nails to knock in, shelves to fix, draughts to stop, and I was going to say simple furniture to make. And why not? I remember spending a few hours with a family and the blind husband showed me what he had done by way of furnishing his flat, and making it more convenient. He had put shelves everywhere. He had made boxes, a cupboard and a book-case. And whilst I was admiring the good order of everything, a youngster of three years old brought his horse in a very proud way. 'Father has put his feet on again,' he said. It appeared that he mended all his child's toys. People may say that this blind man was an exception and that, in spite of the best will in the world, it is not always given to a piano-tuner, or a professor, to turn carpenter at a moment's notice. There are many things less complicated though, that

the blind man might do. He could bottle the wine or chop the wood, for instance. »

If we turn over the pages of this review, with its dots in relief, we often find practical advice for the blind, advice in accordance with their capabilities, as it comes either from blind men, or from persons who live constantly with them, and it is directly inspired by experience.

« M. Géry, » we read, in this same review, « whose parents keep a café-restaurant at Versailles, does use ful work in the house when he has no chairs to cane. With his father, he does the cellar work. The father bottles the wine and the son corks it by machinery. On Sundays, he sees to the cellar entirely and supplies six or seven waiters. He usually washes and wipes the glasses, too, and he carries the tables and chairs into the house from the terrace every evening. »

A blind girl, in her parents' little shop, serves the customers with nearly all the grocery and haberdashery. She knows the drawers in which the various articles are kept, and she weighs the quantities required, very correctly, with ordinary scales.

A blind man, in order to furnish his home, undertakes all kinds of cardboard work, such as box-making, book-binding, etc.

## 4

When he is not in his own home, the activity of the blind man is in proportion to his acquaintance with the place where he happens to be. The extreme agitation of our present life, so considerably developed by the railroad, has certainly complicated the conditions of existence for him. More often than not, his budget or circumstances compel him to travel

alone. Let us read a blind man's notes, with reference to his journey. He will tell us what difficulties he encounters, and how he surmounts them. His account has the merit of being the sincere expression of his experience and of giving those minute details so dear to the psychologist.

« From Paris, I started for Poitiers, by the night express. I took my place in the Tarbes carriage. I prefer it to the Orleans carriage , as it is smaller. Each compartment has a door on to the corridor, and another one at the other side. The dressing-room is in the middle of the carriage. I knew that the train only stopped at long distances, as far as St. Pierre-des-Corps, which was my last stopping place. I knew how long it would take to get to Poitiers. I looked at my watch several times, so that I should not arrive at my station unawares and, two minutes beforehand, I lifted my parcels down on to the seat. One generally gets out on the left hand side of the train, but at big stations one never knows beforehand.

I went into the corridor and opened the window. The train stopped and I listened. There was no noise on that side. I passed by the passengers who were sleeping and, with an apology, I opened the window and then the door. A porter soon presented himself and, without any hurry, I turned round, took my parcels and handed them to him. He accompanied me to a carriage, which took me to a private house where I was expected. I found a guide there. The following morning, I started for Bordeaux by the express. The train was entirely composed of long carriages with doors at each end. Trains like this usually have a man specially employed for the passengers, and he remains in the corridors. I have always found this man very helpful on long jour-

neys. He knows which compartments are generally less crowded, puts me into one of them and arranges my hand luggage. He takes me to the restaurant and brings me back to my place. On passing the frontier, he recommends me to the care of the man who replaces him. A long journey to or from Paris is quite simple in this way. Before starting, I find out where the doors are and where the dressing-room is to be found, as these details depend on the build of the carriage and are variable. Without this little exploring expedition first, I might have a few surprises.

On the journey in question, on reaching Bordeaux, I was met at the station by a guide sent by a person I knew. I then went to the hotel where I had engaged a room. I went upstairs to it and then sent away my guide, after telling him at what hour to come the following day. When my luggage came up, I asked the man who brought it to show me my way about. I noticed very carefully the orientation of the various corridors, the way to the staircase, etc. and then returned to my room. This little expedition sufficed for me to be able to find my way about alone afterwards.

When the man had gone away, I inspected my room, unpacked my luggage, which included my typing-machine and my papers. After washing, I rang and when the domestic arrived, I requested him to accompany me to the dining-room. I asked for a little table to myself. I always speak to the servants very politely, and I generally find them very attentive to me. The waiter read the menu to me and I made my choice. I have had to learn to wait a little, but, whatever happens, I never make the slightest unpleasant remark.

When I have finished, I watch for a favourable

moment when the waiter can go with me to the foot of the staircase. From there, I can generally find my room. I never take part in the conversation of any of the visitors, and they very soon take no notice of me.

Twenty-four hours later, I started for Rochefort, by the State line, which is usually direct, but, on the night in question, quite exceptionally, everyone had to change at the Royan junction.

I was taken by surprise and was busy with my correspondence, and had my papers all undone. The other passengers were as surprised as I was, and there was a general hurry and scramble. At the station there was great confusion. My compartment was very quickly empty. I stood in the door-way and waited. Everyone was hurrying along, but no one came to my aid. I then called out: « Is there a porter? » and this succeeded very well.

On arriving at Rochefort, I had no room engaged. I requested the porter who had taken my luggage out of the compartment to take me to the omnibus of the best hotel in the town. On arriving and getting out of the omnibus, the surprise of the hotel people was expressed by an uncomfortable silence. It did not last long, but it was a disagreeable moment. It is always very different when I have prepared my way by a letter..... »

I will stop here with the diary of my blind traveller. His journey continued by Niort and St. Maixent. He then went back to Parthenay for the night, and returned to Paris without any further incidents of note. He is not one of the most venturesome of blind travellers. I know some who pride themselves on getting out of a train, following the crowd, guided only by their ear, until they reach the street, and then finding their own way about a town which they

only know by the plan. My conviction is that they get along very badly, after making various humiliating mistakes and risking great dangers. The blind who care for their safety, and also for their dignity, avoid, as much as possible, these daring feats, which draw attention to their infirmity. If, when traveling, they make a great deal of use of the substitution of the senses, they know very well, too, that, in many circumstances, they must appeal to the help of those who can see.

## 5

With regard to activity of a professional order, among the numerous examples of special aptitudes that it would be easy to give, I remember two which could easily be verified. In both cases, qualified men of these particular professions will see for themselves the play of the substitution of the senses.

M. Béraud, a blind electrician and mechanician of Marseilles, expressed himself as follows about his work :

« For the last seventeen years, I have occupied myself with electricity and machinery as an amateur, and sometimes professionally. Although I had a certain success at the Marseilles Conservatoire, in the Violin and Harmony classes, I must own that I should often have preferred spending my time with electricians, touching everything in their workshops, or going for long expeditions on a tandem or a motor quadricycle. When I was fifteen years of age, I arranged a little installation of electric bells in our flat, which was a good-sized one. My installation was rather complicated. There were several variations; three wires for calls and replies, safety

contacts and commutators in several directions. Later on, there was an indicator with four numbers.

I used to delight in questioning electricians and I used to have books on electricity read to me. My father told me that although my installation worked perfectly, it was not very well made. I, therefore, began again and re-installed it, according to the rules of good taste. The wires matched the papers and curtains, and they were also quite straight, well stretched and, as much as possible, hidden from view. In some cases they disappeared under slits or mouldings on the walls. As my indicator was placed in a dark passage, I had to put an electric lamp there, so that the numbers could easily be seen. The lamp was lighted or extinguished automatically.

When once this installation was finished and had been approved by men of the trade and by my father, who is an architect and contractor, I took up telephony. After studying an installation plan, that a friend made for me, with a board and strings fastened with nails, I installed two little first posts. Later on, I replaced these by more modern arrangements with induction bobbins. At that time I had a little phonograph with cylinders. Ten years ago, the speaking-machine was not what it is at present. My dream, therefore, was to have a reproducing diaphragm, capable of purifying the sonorous waves which came out of the apparatus laden with bad vibrations. After many experiments, by combining a diaphragm of very thin firwood with a Mildit microphone, I obtained a telephonic audition of very great purity.

I then supplied all our gas jets with electric taps. These taps light the gas automatically when they

are turned on. The carelessness of those we employed, in not turning off the taps safely,caused short circuits. I then made an extra current bobbin, supplied with a short circuit alarm.

My letter-box alarm is a small apparatus for placing at the bottom of the box. Directly the least weight falls on it, this sets in motion an electric bell. A visiting-card suffices for this. The apparatus is the simplest thing possible. It consists of an ordinary letter-weight, supplied with a very sensitive contact. It works very regularly.....

It has often happened that I have arranged electricity installations in the houses of my father's clients. A young workman from our carpenter's shop is all the help I need for my work. When visiting the rooms, as an electrician who can see would have to do, in order to see what the client wants and also to arrange in my mind the plan for my canalisation of wires, I always note, as I pass,without seeming to do so, the place of furniture, pictures, and various other objects. After this, I can work alone, if needs be, in one room, while my man is at work in another one, and I can handle the ladders and wires quite well. There are cases, though, when it is absolutely necessary to have a second person, and there are also cases when one must have eyes. I have arranged many installations in very large flats, and for persons who would never allow any defect to escape them. I have always given satisfaction, and no serious accident has ever happened to me personally.

An installation that was very difficult was one in the little Gavotte Church, near Marseilles. I had to put in wires against the walls, at a great height, and to avoid the pictures, statues and ornaments of all kinds. Installations in new houses are, of course,

very easy, that is provided one is not inconvenienced by workmen of another trade, as so often happens.

After all I have said, I would not, nevertheless, advise my companions in misfortune to choose for their trade that of electric fitting, nor that of mechanician for cycles and autos. I think, though, that the blind should be induced to take up manual work, even if they do not have to earn their living by it. My family and my friends have always encouraged me to do things myself, and I am quite sure that if a greater number of the blind developed their manual skill, the results obtained would astonish many people.

As regards my mechanical work, I will just say that, after the tandem with pedals, and the quadricycle, I arranged a motor in a strong ordinary tandem. I obtained very good results with this tandem-motor. I also arranged a light tricar with an old Werner frame, etc.

Very frequently my friends send for me, or bring me their machines to repair. At the Automobile Salon of 1910, I did work in public of various kinds: fitting, regulating, and repairs to the Regence bicycles and motocycles. I made part of my present Regence Tandem-motor myself. With this machine, I have had, and still have, great success. With it, my pilot and I were classed second at the Automobile meeting of Ventoux in 1911.

The chief kinds of work that I manage to do with success as a mechanician are: complete fitting of all kinds of wheels with tangent, metallic spokes (filing and fitting of the spokes) taking to pieces and fitting again, regulating, arranging all kinds of motors, of motocycles and a good number of repairs generally; repairs to pneumatics of all kinds. I also manage to solder the cables for breaks etc. »

6

Although M. Béraud's case is extraordinary, it is not unique. I find that, at Magdebourg, M. Moünnich installed private telegraphs, telephones, and electric lighting without having gone through a real apprenticeship to the trade of electrician. Skill of this kind, although it is more striking at first, is less surprising to me than the skill of a cabinet-maker who does not shrink before any of the difficulties of his trade. It is also less capable of practical application for, we may as well say it more emphatically than M. Béraud does, our special schools cannot dream of training workmen-electricians. There would be too many complications and too much indulgence necessary to enable blind men to face all the difficulties with which they would meet, such, for instance, as moving about among all the numerous gimcracks with which the electrician is surrounded whilst at work. The blind man can only be his own electrician, and perhaps the electrician of his friends. On the contrary, all the progress realised by the blind in carpentering, or in cabinet-work, is very useful to him for the manufacture of pianos, and it is well known that many of our piano-tuners are, at the same time, piano-makers.

M. Claudius Démonet has a shop for pianos and instruments of music at Vichy. He is busy all the summer supplying visitors with pianos and in going about, by tandem, in the country round tuning pianos. The winter season he devotes to manufacturing them. His shop and his work-shop are then full of instruments taken to pieces, of pianos, harmoniums etc. He repairs these in all kinds of ways and, as he works alone, without the help of any

workman, it is easy to see what he is able to do. Whoever wishes to do so can go and see him at work. There are some admirable pieces of cabinet work, and of muscial instruments, to be seen there, which are entirely the work of his hand. No one could pay him a visit without being amazed at what he can show.

Démonet was blind from birth. His parents did not know that there were special schools to which they could have sent him. During his early years, therefore, he only had a very scrappy education. But a great need of activity, which is the salvation of the blind, urged him to move about a great deal, to touch and pull to pieces everything he came across, to learn almost alone how to play the viol, then the clarionet, and then to work on wood, without any guidance, but with intense pleasure. At the age of nine, he had nothing but his knife as a tool. Struck with what he did with so little, his parents allowed him to use certain simple tools.

He could then make bird-cages, little wind-mills, and a tiny weaver's loom, which astonished all around him. I am told that at the age of twelve, he could make all the tools he needed: planes, of various kinds, tools for moulding etc. He made these for his little companions, in exchange for the wood they brought him. I am also told that, at the age of thirteen, he made a large bed in Renaissance style, which is kept by his family.

While still a youth, besides various pieces of cabinet-work, he made violins and viols which he sold to the people around. For four years, from the age of fifteen to nineteen, he worked with a carpenter of Langy (Allier), among fellow-workers who could see. He earned at first tenpence a day and then, gradually, his wages were raised to a shilling and

eightpence. From the age of 19 to 23, he worked with a carpenter of Jaligny, who paid him £2-12-0 a month and gave him board and lodgings. These wages were, in that district, what ordinary workmen, of the same age, earned. Démonet did exactly the same work as they did, but rather more slowly. No one cut wood more exactly than he did. Among other pieces of furniture which, we were assured, he made entirely alone, at that date, was a beautiful chest of drawers with a carved plinth, and two wardrobes with Grecian corners and carved appliques and cornices.

Démonet did not go to a special school for the blind until he was twenty-three years of age. He then completed his elementary education and began his manual instruction, which he continued in Paris with the firm of Focké. From that time forth he worked chiefly on pianos and harmoniums. It was his extraordinary skill in construction, still more than his ability as a piano-tuner, that enabled him to buy an important business which was just about to close.

Within a year it was flourishing again, as the new owner added to it the most important workshop for repairs in that centre. At present, after four more years of effort and hard work, Démonet is doing very well and there is no work, no matter how complicated it may be, that those who know his house will not confide to him.

The pianos, entirely taken to pieces, which encumber his two shops, and the fragments of musical instruments, of all kinds, scattered about speak eloquently of all that his skilful fingers can do.

I was present when a specialist refused to admit the idea that out of a harmonium, with a fixed key-board, a harmonium with a transposing key-board

could be made, and that they could prepare all the pieces of wood and even of iron necessary. Démonet is now working on a small piano of five octaves. The chief parts for it are already made, and he intends to finish it entirely himself. Manufacturing and repairing such varied objects would, of course, be impossible if Démonet were not able to work with iron as well as with wood.

He can manipulate it, but there are certain insurmountable difficulties connected with it which he does not meet with when working on wood. He cannot touch red hot iron and, therefore, cannot attempt soldering. For all this, he is obliged to be helped by those who can see.

When he has any free time, and this is rare, Démonet returns to his favourite occupation of making cabinets. As specimens of his skill in this line, besides the carved wardrobes, of which I have spoken, one can see a mandoline with a border of ivory and ebony, inlaid boxes, a large book-case in Louis XVI style, with four doors surmounted by four glass ones. This piece of furniture is at the end of his shop. A small work-table of walnut wood with a band of dyed wood, the four feet of which are richly carved and joined together by crossed bars with a vase, was sent by Démonet to an exhibition at Jaligny, in 1906, and won for him a silver medal. I was told that two hundred francs were offered him for this little table.

Démontet is convinced, and assures everyone, that we should be less surprised at his skill, if we were less ignorant, and that if we only took the trouble to help the blind to work on wood, very many of them would do work equal to his. His example, and a few others that we might give, certainly show us that we might do more along these lines than is

done at present. I very much fear, though, that his case would prove to be quite an exceptional one.

## 7

The examples of Béraud and of Démonet, remarkable as they are, do not prevent us from seeing the insurmontable obstacles in the way of the blind, when it is a question of their activity. The greatest of these obstacles are the difficulty of adaptation to surroundings, and slowness (1). These are the in-

(1). M. Gorlia has given us a very detailed account of his work during the ten years of his employment as a brewer. *(Le Valentin Haüy*, May 1911.) We have information also with regard to the methods employed by a blind glass-cutter, M. Raemaker *(Le Louis Braille*, 1894, page 18). We are also told of a blind man very clever at vine dressing and at grafting fruit trees. Thanks to this, he was able to provide for his aged parents and for himself *(Le Louis Braille*, February 1891).

It is a pity that we have no exact account of the methods of work employed by the blind cutler who died just recently. He worked at his trade in Paris for many years. To set in motion a knife-grinding machine, worked by a gas-motor, and to sharpen knife blades, any blind men could do. But the one of whom I am speaking could make all kinds of objects. Although, like other cutlers, he received regularly from Thiers blades wich were ready for use, he has, in my presence, cut steel blades on his vice, reduced them on his anvil and sharpened and filed the ends. He assured me that, without any help, he tempered them and took the red hot blade out of the furnace with tongs. But what struck me the most was the precision with which he adjusted the various parts and the springs, seven, nine or more, for the handle of a little pocket-knife. He had cut the pieces for the handle himself out of ivory, horn, brass and iron. He had fixed the dimensions for each one and marked the places for the nails. The slightest fault in his very exact measurements would have sufficed to have thrown everything out; but there was no fault and the little knife worked perfectly. Those of his clients whom I questioned were thoroughly satisfied with his work of every kind. And yet he could not earn his living, as he worked too slowly.

M. Person, who was blind from the age of ten, learnt clock-making alone by taking clocks to pieces and putting them together again. He has done various work of this kind, and for seventeen

feriorities of the blind. It is not that they are radically unfit as some people appear to think. It is that blindness cuts off most of the communication between the blind man and things, or rather it leaves him in touch with only a few objects and those the nearest to him. To normal work, then, is added, in nearly all cases, the necessity of reestablishing this communication.

Thought, which is within us, is just as quick and as supple in the blind as in the person who sees. It is the same with the more simple movements. But the more the blind person wants to exteriorise himself, in order to act outside himself, the more complicated is the supplementary task.

When the objects he has to handle are numerous, scattered about, and changing, the substitution of the senses is not able to put him in contact with them in the required way. The difficulty of getting quickly acquainted with his surroundings, and of adapting himself to them, keeps him also from many other trades than that of electrician.

There are plenty of others left, no doubt, trades which can be plied in fixed surroundings and which are relatively not very complex. There, at any rate, the substitution of the senses will allow the blind man to reestablish communication between himself and things around him. It will readily be understood though, that on account of this necessity, it is more difficult to contract a habit, and when once this is

years he kept the big clock in order in the workshop for the blind, Rue Jacquier, Paris. At present, he is living at the Paris Blind Asylum, known as the *Quinze-Vingts*, and I am told that he has put in order about a hundred clocks. The springs of a watch are too delicate for him, but he considers that any blind man who has a taste for mechanism, and a certain amount of skill, order and patience, can learn to clean and repair big and medium sized clocks. It takes a blind man about four times as long, though, as it would take a man who sees.

contracted, that habit only produces very incompletely its usual effects, which are to make the act more rapid and more easy. This is why the blind man, although he may be capable of doing many things himself, finds it difficult to earn his living as a workman. By means of the substitution of the senses, either by direct substitution, which is merely a better interpretation of the sensations of all, or by indirect substitution, that is by making use of an intermediary for translating into tangible signs the visible signs interpreted by the person who sees, the blind man manages to overcome a considerable number of difficulties which seemed as though they would bar his road. But in order to go round the obstacles, as it were, more time is required than to jump over them. The more one sees the activity of the blind man, the more one is persuaded that the slowness of his movements is the principal impediment for him. His work is irreproachable, but it is generally too slow for serving as a means of livelihood.

# THIRD PART

# THE SUBSTITUTION OF IMAGES AND THE FURNITURE OF THE MIND

## Chapter IX

## SPATIAL IMAGES THE OUTCOME OF THE SENSE OF TOUCH

### I

In order that this extremely complex activity, some aspects of which we have just seen, should be possible to him, the blind man evidently needs representations which will govern his movements.

We must penetrate into the mind of the blind man and ask ourselves what are these representations? Are they muscular images, bound to each other by temporal relations? Are they images of a spatial order? Introspection replies without hesitation. Both, most certainly, but more particularly spatial images. Logically, although either might suffice for the more simple modalities of the blind man's action, it is clear that the more complicated ones are more easily explainable by spatial representations. But what can these spatial representations be which are the outcome of the sense of touch?

There is no question more frequently put to the blind by those who see and think than this: « How do you imagine to yourself such and such an object, a chair, a table, a triangle? How do you represent it to yourself?» They feel that with the blind man, the furniture of the mind must be quite different from theirs.

« The blind man does not imagine, » says Diderot in his *Letter on the Blind*,» for, to imagine, one must colour a background and have certain points standing out from that background, but giving them a different colour from the background itself. Give to the points the same colour as the background; they are at once mingled with it, and the figure disappears. That, at any rate, is as things take place in my imagination; and I suppose others do not imagine differently from me. When I propose to myself to see, in my mind, a straight line, otherwise than by its properties, I begin by imagining it covered with white canvas and a row of black dots placed in the same direction. The more the colours of the background and the dots contrast, the more distinctly do I see the dots, and any figure of a colour very near akin to the one of the background does not tire me any less to consider in my imagination than outside of me, on a canvas for instance. »

Thirty-four years later, on reading again, shortly before his death, his work written in his youth, he added :—

« I confess that I have never clearly understood how she (Mélanie de Salignac, a blind girl,) could figure things to herself without colouring them. This cube, was it formed by the memory of the sensations of the touch? Had her brain become a kind of hand under which substances became real? Had a kind of correspondence been established between two

different senses?..... What is the imagination of the blind? »

General opinion is, on this point, absolutely with Diderot. It cannot suppose that the blind should have, in their mind, concrete images of the objects which surround them. How should they have them, since they lack the photographic apparatus which transmits these pictures? As, for most individuals, the mass of visual images occupies, nearly all the time, the field of consciousness, there was only one step to take in order to empty the brain of the blind of all its sensitive contents and leave there only mere ideas. Without being aware of it, general opinion judges like Diderot, from a sensualistic point of view,and believes that the loss of one sense must fatally cause profound disturbance in all the mental mass.

When one thinks of the importance of images in the exercise of thought, of the rôle they play in the affective life and in the æsthetic life, one is not surprised that so many individuals who have their eyesight, and who would take these images away almost entirely from the blind, should so easily imagine the blind person's brain to be benumbed, as it were, and in perpetual torpor.

Diderot, who was a philosopher and had a supple mind, escaped, no doubt, falling into the error of these extreme conclusions of the vulgar. He had, too, the blind man of Puiseaux as an example and he also tells his readers about Saunderson. These were two cultured blind persons, and he must have been well aware of their rich intelligence.

He wrote about them, altering facts to fit into his theories, and also in order to remain in agreement with the notions of rudimentary sensualism of his friend, Condillac.

For such sensualism, the image is the imprint of sensation. Taine, the continuer of Condillac, although he represents a remarkably flexible doctrine, also professed that images were « the exact reproductions of sensation ». In speaking of images, he says :

« Here, for instance, is a second group of sensations, so like the first ones that one might call them revived sensations and which repeat the first ones, just as a copy repeats the original, or an echo repeats a sound. In this way, they have the properties of the first ones, they replace them in their absence and, performing the same service, they must cause the same mental work. »

Diderot thinks that as the person born blind has only explored the outer world by touch, his images will necessarily keep the characteristics of the tactile and muscular sensations which gave them birth. And this is how he endeavours to represent these to himself :

« Although sensation is indivisible in itself, it occupies, if one may use this term, an extended space. The individual who is born blind has the faculty of adding to this or of reducing it, in thought, by increasing or diminishing the affected part. He composes in this way, points, surfaces and solids He will have a solid as large as the terrestrial globe, if he supposes the end of his finger as large as the globe and occupied by sensation in length, width and depth. »

And after having observed that, in consequence of this localisation of the tactile images and the impressions which they cause in the organs of touch, a deaf-blind man would necessarily be tempted to place the seat of the soul in the finger-ends and not in the head, to make of the fingers the theatre of thought. He goes on to say :

« The sensations he has had by touch will be, so to speak, the mould for all his ideas and I should not be surprised if, after a deep meditation, his fingers were as tired as our head would be. »

Diderot then does not deprive the blind man of concrete representations, but he concludes that there is an absolute difference between his imagination and that of the person who sees. He digs a ditch between their conceptions of the real and their forms of thought. All is, consequently, for him, a problem as regards the intellect of the blind. The faculty of constructing images, with which he credits that intellect, is, no doubt, very second-rate, since it must be no small impediment for the mind, that of being stopped at every step by the heavy baggage of the modalities of touch, the operations of which are so slow, compared with the operations of sight.

2

I am now going to try to show that these impediments do not exist, or, at least, are much less great than people suppose.

We come across spatial images in the brain of the blind man. Such images are poor ones, undoubtedly, but very concrete. Psychologists have always neglected studying these and yet, in many of the circumstances of intellectual life, and even of active life, they are the natural substitutes of visual images.

The image which the blind man receives by touch rids itself easily of the characteristics which constitute the modalities peculiar to tactile sensation, and it differs greatly from these. The residue which it keeps, if it does not contain colouring which is

absolutely foreign to the tactile nerves, and if it be, therefore, less rich than the contents of the visual image, may frequently not include any element which is not in the visual image and may coincide very nearly with that.

Let us take a chair, for instance. The eye takes it in at a glance and, in the shortest time possible, observes the whole structure of it. The finger, on the contrary, explores all parts of it slowly and methodically, and it is not until after a work of juxtaposition that the object, progressively constructed, appears as a whole. The characteristic of the tactile sensation is that it is analytical and successive, whilst the visual sensation is synthetic and instantaneous.

That is not all. The outlines of the chair are determined for the eye by an impression of coloration, and it is the colour which, immediately projected from the eye and objectised, marks, at every point, the exact frontier between the object and the surroundings in which it is placed. As regards touch, it is the impression of resistance which supplies the same limit, a complex impression, as we know, for it consists of the play of muscles and tactile nerves, and it is generally localised very distinctly in these organs.

The two orders of sensations appear then with very different modalities. But if, an hour after feeling it, I search in my consciousness for the memory of the vanished chair, I do not, this time, have to think of each one of its staves. I do not reconstruct it by means of fragmentary and successive images. It appears immediately, and as a whole, in its essential parts, with its seat, back, four legs, and the staves which unite these. There is no procession, even rapid, of representations, in which

the various parts come and join themselves to each other, in the same order as for my first sensation, but with a speed a hundred or a thousand times greater.

The chair suddenly appears to the consciousness, entire in all its parts. Its various elements co-exist in it, with perfect clearness. The chair appears there with a very real complexity. I could not tell in what order the various parts were first perceived by me, and it is just as easy now to give details about them in a different order.

The testimony of all the blind agrees on this point. This is not an individual peculiarity, but a fact of constant experience and, I would add, a fact of great consequence. If the blind man were subjected to the necessity of reconstructing each of his images, the result would, naturally, be increased slowness in the exercise of all his mental faculties. His thought and his emotivity would be blunted, as it were, just as his physical activity is made slower by his blindness.

The impression of resistance, in many cases, has vanished like the analytical characteristic. I imagine the chair without evoking my hand, and therefore independently of all sensation in the muscles of my fingers. Undoubtedly, I could easily recall those vanished sensations and fasten them on to the image, but spontaneously that appears to me entirely free from their cumbrous escort. In an investigation which was made in Germany, with regard to the images of those who are born blind, it was found that the sensation of the movements which accompany touch never come to the consciousness with the representation. The blind man thinks no more about the muscles of his hand than the person who sees thinks about the muscles of

his eyes (1). All those on whom experiments have been tried are absolutely affirmative as regards this. The blind man does not feel his finger tips swell according to the size of the chair.

What then is the residue of this work, and what remains, in such images, of the sensation which engendered them? Our reply varies, of course, according to the cases and the individuals. The limit towards which they tend and which, by questioning our introspection, we find that they appear to reach, is simply form. Very often only the form of the object stands out in the consciousness, not the idea of a form, but a concrete form, a clearly sketched form.

Where does this reality come from? From impressions of resistance? From the images of fleeting perceptions? Reason compels me to recognise this origin for it, as it cannot come from anywhere else. If I insist on my representation, if I try to study it more closely, I evoke tactile and muscular impressions which are then added in order to consolidate it. But if I appeal to the immediate notions of my consciousness, I discover nothing at first but a simple form. On finding that another element must be admitted, I experience the same surprise as common opinion when it is revealed to it that an object is nothing but the sum of sensations perceived.

For a man who sees, the image of a chair is, at first, merely a coloured patch, like the image of a rainbow. With experience, though, thanks to the impressions of all kinds which group themselves

(1). This work of elimination begins at the time of the sensation. As the attention becomes more and more concentrated on the work of construction of the object, it loses more and more the subjective impressions which accompanied it.

around them, the two images take a different value. A reality is perceived behind the coloured patch which represents the chair, whilst that which represents the rainbow is only considered as a play of light. Resistance then is implied in the image of the chair. It is there, without being directly perceived, and without there being any conscious accompaniment of muscular impressions. On analysis, resistance seems to play a similar part in the images of the blind. It seems to be only given in a secondary way and as an accompanying impression.

I take, in imagination, two vases of the same dimensions. I fill one with water and the other with gravel. I then place them in front of me, a few inches away, and I compare the images that the two surfaces thus obtained give me. The difference between them that I perceive, immediately, is not a difference of resistance, but a difference of form. The surface of the gravel does not appear to me more consistent, it appears as unequal, irregular, all in projections and hollows. I replace the gravel by a block of ice, the smooth surface of which will be like that of water. Certainly, in a little while the block of ice will be hard under my finger, whilst the water will give way under pressure. I can, nevertheless, get a moment when the two images will appear identical to me, freed from tactile materiality.

## 3

This double faculty of unification and purifying of images, in order to render them at the same time more conformable to the real, and more amenable to the mind, is naturally very variable. It varies with the subjets and, with the blind, as with those

who see, representations differ very much according to the individual. This faculty varies also according to the objects. The smaller objects, those which can be held in the hand, have a marked tendency to keep their tactile modalities. There, no effort of synthesis will interfere to disturb them.

I have always classed numbers under the form of tactile images, as the Braille system figures them, and it seems to me that most of the blind whose tactile memory is developed do the same.

Geographical maps, in relief, which I studied as a child, always return to my imagination impregnated with tactile and muscular impressions. As soon as I try to follow the details mentally, with a certain precision, I have the sentiment that I am touching them. And I am not much surprised at that, for they are covered with too many intermingled lines, and too many different dots, intended to mark the towns, the frontiers and the surface of the ground, for all this complex medley to be represented, as a whole, in my imagination. I would add that a geographical map remains on the margins of one's life, as it were. For anyone who is not a specialist in Geography, maps have nothing to do with one's everyday work. It is not the real thing, which the mind must manipulate and modify in order to act, but a translation of the real, and of a real too vast for our imagination to feel the need of grasping it, habitually, with a view to action.

If I hear the Alps spoken of, various representations of them spring up before me. If the mention of them gives an idea of them as a whole, I should be more likely to have a tactile image, not certainly an image obtained by supposing my finger-end as extending in length, width and height to the proportions of the Alps, but an image of a series of

big, massive dots, like the one that my map of Europe gives, for my forefinger, of the Alpine chain. Should the context speak of tourism and of excursions, I should be more likely to have a muscular representation of a slope, very steep and difficult to climb. I do not think that, in any case, a spatial and synthetic image, free from all tactile elements, would present itself to my mind.

On the other hand, objects of everyday use, provided that their dimensions are not too great, and that they are not too complex, such objects, as chairs, tables, entire rooms even, present themselves to me all at once, and with comparatively little omission as regards contents. It would be interesting to measure, experimentally, how far the complexity of these images can go. It would be a delicate task, for the imagination does not give up trying to seize objects that it cannot grasp. It only debases them more or less, according to its requirements, in order to adapt them to its possibilities.

As to objects of small dimension and simple structure, even such as one can easily hold in one's hand, when they are of everyday use and constantly in one's thoughts, as far as I am concerned, such objects have a strong tendency to get free of their tactile particularities.

Many circumstances, then, influence the elaboration of spatial images with the blind, and particularly individual experience,which tempts us to give more or less importance to such or such an element of the representation. But the essential factor of transformation certainly seems to be the activity of the mind which is at work in our conceptions and our images, cutting them down or enriching them at will, in view of their utilisation for the requirements of life

Something similar takes place here to what happens in the elaboration of generic images. In order to form the representation of the ordinary table, the mind selects, among the qualities supplied for it in abundance by the perception of concrete tables, those which are essential, I mean those by means of which the table fulfils its practical function and serves the requirements of man. These are really representative and intuition reveals them. The others have superfluous qualities, which the imagination only retains for passing from the knowledge of the general table to distinction of various tables. The mind of the blind person seems to work in the same way on the rough, tactile sensations which he gets from the outer world. He eliminates the rough element by setting aside, in order to retain them, only the qualities which are constantly useful, qualities of form. He combines them, as they are much more ready for use when presented to the thought as a whole, after reducing all the elements of sensation which are impediments to the easy handling of the image and, consequently, to the utilisation of it.

At all events, the essential fact is that the blind man, too, has at his service spatial synthetic images, images that are very supple and very mobile. He has what I should style a veritable *tactile sight*.

The word *sight* is the only one which renders these apparitions which spring up in the brain, free from all conscious muscular impression, from all representation by fingers or hands. They are less rich, certainly, less complex, and considerably less extensive than visual images, but, like them, one and many at the same time, perceived, in their entirety and also in detail, by the inner eye of consciousness.

## Chapter X

# TACTILE SPACE AND VISUAL SPACE

### I

Are we right then, in saying that the blind man's space is the same as the space of the man who sees? It seems so, and general opinion has never yet established a distinction between tactile and visual space.

The distinction has been made by certain philosophers who, confident of their logic and disdainful of experience, affirm that if those who are born blind use the words size, form, position, distance, like normal persons, these words have not the same sense for them. They say that the word distance, for instance, means for them the tactile and muscular sensations which they feel in stretching out their arm towards an object, or the number of steps they would go to reach an object further away, or the time it would take them to reach it, or the feeble impression made on their ear by the sound of words far away from them. The difference appears so great to Monsieur Bourdon that he writes as follows :

« The tactile sensations of form differ essentially from the corresponding visual sensations, and a man born blind who, after an operation, passes from the first sensations to the second is, at first, quite as bewildered as a deaf man would be who has learnt to distinguish, by sight, a violin from a flute and who,

on recovering his hearing, is asked to shut his eyes and then try to distinguish between the two instruments, from the sounds they give out. »

Do not let us lose sight of the fact that space is in relation not with the specificness of the visual and tactile nerves, but rather, it would seem, with the disposition of these nerves in each organ, and with their relation to certain systems of muscles.

« If there is, » writes M. Lechalas, « one result which, outside all theory, may be considered as definitively acquired, thanks to the work of experimental psychology, it is the necessity of co-operation, for the precise perception of space, between the muscular sensations and the tactile or visual sensations..... But the union of the visual or tactile sensations with the muscular sensations does not suffice for making us perceive spatial objects with precision. Every point of the object must also make its impression at a given point of the sensorial organ. —We may put the two conditions into one statement and say that sight and touch only give us a quite clear perception, provided the movements of the organ allow the various points of the object to make impressions one after the other, on the sensitive part, at the same time ensuring the correspondence of one point of the object with one point of the organ. »

The cutaneous surface only gives us, immediately, two dimensions. It is by means of the movements of the muscles that we add the clear perception of shapes and also the third dimension. Roughly speaking, and leaving out of the question a few special aptitudes of the eye, which constitute its superiority, everything takes place in the same way for sight. The retina, which supplies two dimensions, is only a cutaneous surface, the nervous fibres of which are exceptionally sensitive, and two or three hundred

times more in number than on the tip of the tongue, the surface where they are the most dense. The Germans call it *Netzhaut*, or retina-skin. Visual acuteness is measured by the shortest distance which separates two retinal images, each one perceived separately, just as tactile acuteness is measured by the minimum separation of the two branches of the æsthesiometer at which the two points are felt distinctly. And as to the perception of the third dimension, and of that of form, they are rendered possible by the movements of the muscles of the eye, which play a similar rôle to that of the movements of the muscles of the fingers and the limbs.

The principal theories acknowledged at present on the genesis of visual and tactile sensations continue this parallelism. In the opinion of nearly all philosophers, psychological work is necessary for completing the spatial sensations of sight, and no one can deny that this is needed, too, for obtaining synthetic tactile space, such as we have just found it in the representations of the blind, from successive notions of touch. This psychological work for the former is more particularly of a logical nature: for the latter it consists in associations between notions of sight and those of touch.

Now if we admit the intervention of logical operations, they proceed from a same mind acting on the two senses for the same end : that is to procure, from both of them, a spatial centre, upon which it can throw its representations. These logical operations, according to all appearances, would not introduce, between the two spaces, an element of divergence.

If we are to believe, with most psychologists, in a synthesis between the notions of tact and those of sight, we suppose, it would seem, that the composing

elements are of the same nature, otherwise the composite would not have the homogeneity which we attribute to it. Then too, it has always, and very naturally, been thought that the part of sight in the composite must be sought in the synthetic character of the spatial representations. Now, as we find at present, in tactile space, which is deprived of all help from sight, precisely this same synthetic character which seemed as though it could only belong to sight and would make the difference between the two spaces, is there not every reason to believe that they resemble each other very much?

Certainly these are only probabilities, and I agree that doubt may always slip in between the meshes of such reasoning. Experience has much more weighty value. Now experience shows peremptorily that space for the blind, as well as for those who can see, is characterised by three dimensions: length, width and depth, and that it comes practically to the same results, that the same geometry is applicable to it, and that many blind men, like Saunderson, have aptitudes for the study of geometry. These are certainly presumptions which are not lacking in force.

It must not be objected that when individuals who were born blind, after an operation for cataract, suddenly see, they cannot distinguish between a sphere and a cube, or rather, if they distinguish between them, they cannot tell which is which. It was believed for a long time, from this observation, tried with many subjects, that sight does not perceive space directly, but certain signs which, by association with tactile spatial sensations, we interpret as a function of space and that, consequently, space is exclusively supplied by touch. It seems to me that this interpretation is very rightly given up,

at present, by nearly all psychologists. The eye also certainly appears to supply the perception of space. But it would not be any fairer to draw, from the same facts, this other conclusion, namely, that tactile space is different from visual as, otherwise, it would be immediatly recognised by sight.

The truth is that the eye, in order to perceive space, requires to be educated, to learn to bring its muscles into play and to interpret their movements. At first, it only sees two dimensions, and it even sees these imperfectly, whilst all perception of depth seems to escape it. All those who have been operated for blindness declare that, at first, all objects seem to touch their eyes. It is true that a few partisans of the nativist school, Monsieur Janet and Monsieur Dunan, for instance, have imagined an ingenious way for rendering such testimony worthless. They suggested that for individuals just recovering from blindness the word *touch* has only a metaphorical value and that, not yet knowing the sensibility peculiar to sight, they could not, when it was suddenly revealed to them, designate it by any other term than one borrowed from their usual sensations. This is really too fantastic and too convenient a conception of the psychology of the blind. A few of these operated persons, among others the one operated on by Franz, proved, by their answers to questions, that they were intelligent. The man born blind does not, of course, know what it is to see, but he knows that an essential difference exists between seeing and touching, and that difference is that one can see an object from afar, whilst one can only touch it when one is near to it. When he replies, therefore : « the objects touch my eyes, » on being asked if he sees them and where he sees them, we cannot doubt but that he gives its proper value to the word *touch*.

His eye then needs the experience which it has hitherto lacked, that of co-ordinating all the movements of its muscles, in order to have complete perception.

And, in the same way, the touch also needs education. A child does not discern with precision the shape of a spoon that is put into his hand, any more than if it were placed before his eyes. He must learn to direct and to co-ordinate the movements of the muscles of his hands, like the movements of the muscles of the eye. Let us imagine a subject deprived from birth of the sense of touch and suddenly recovering it. He would, undoubtedly, be incapable, if he closed his eyes at the very moment of his cure, to recognise objects by touch which he had hitherto only known by sight. He could not explore them, and build up a representation of the whole, with his partial sensations. It does not follow at all, though, that on account of his incapacity he would find himself, with regard to visual space, in the situation of a deaf man suddenly cured who is asked to distinguish between musical instruments on hearing them. The latter might listen, with his eyes shut, for a thousand years and he would be no farther advanced than the first day. There is nothing to prove that it would be the same for the subject that we imagined.

I do not see anything then, from facts obtained, which prevents us from admitting that a close relationship unites the spatial representations of those who see and the spatial representations of the blind. We touch here on two theories, both of which have their respective partisans. The older of these theories rests essentially on an observation of Platner's, although it was really deduced before Platner, and dates back as far as Leibnitz. This theory attributes to the eye alone the perception of space, and affirms

that touch, reduced to its own forces alone, could not furnish any idea of space. The other theory, which is quite recent, is due to Monsieur Dunan. It accords to touch the faculty of perceiving a space, but esteems that this space is radically heterogeneous to the visual space and cannot become the same as that.

2

«As regards the idea,» says Platner, « which, without the help of sight, we might have of space or of extent, the methodical observation of a subject born blind, which I undertook with special reference to the controverted points, and which I continued for three whole weeks, convinced me afresh that touch, reduced to itself, knows absolutely nothing of all that concerns extent and space, that it does not know what it is for a thing to be locally beyond another and, in a word, that the man deprived of sight perceives absolutely nothing of the outside world, except the existence of an active principle, distinct from the feeling subject on which it acts, and, with this existence, that of a simple plurality..... shall I say, of things or of impressions? (I am in agreement here with M. Tiedmann. *On the Nature of Metaphysics* in the first volume of *Hesse's Memoirs*, page 119.) In reality, it is time which, for the man born blind, serves as space. Remoteness and proximity only mean to him the time more or less long, and the number, more or less, of intermediaries which he needs for passing from one tactile impression to another. The man born blind talks in the language of the man who sees. This fact is liable to cause us to make mistakes. It misled me at the commencement of my investigation. In reality, though, the man

born blind has no notion of things outside each other and, (my observation with regard to this seems to me decisive) if the objects, or the parts of his body which come into contact with them, did not make impressions of different kinds on his tactile nerves, he would take all that is outside himself for a single thing exercising on him successive actions, a stronger action, for instance, when he places his hand on a surface than when he only places his finger there; a weaker one when his hand only skims the surface, or when his feet move along it. If, in his own body, he distinguishes a head and feet, it is not at all by virtue of the distance which separates these two parts : it is solely by the tactile sensations which come from both of them. He distinguishes the differences of these sensations with incredible subtlety, but also with the help of time. It is the same thing with regard to foreign bodies, the figures of which are only distinguishable for him by the kind of tactile impressions that they produce; the cube, for instance, by its angles and corners affecting the sense of tact differently from the sphere. »

What discussions and arguments have been based on this page ! Only recently, Monsieur Lachelier, with the admirable dialectic ability for which he is renowned, fastened on to it a whole long chain of clever deductions. It has been discussed and commentated but not verified. Montaigne was singularly right in saying : « Men enjoy finding the reason for facts that are told them much more than searching out the truth about them; they leave the things alone and run after the causes. Thanks to this custom, we know the foundations and the middle term of a thousand things which never were, and worry everyone about a thousand questions, the for and against of which are both wrong. »

In truth, we are very lenient with Platner and very easily satisfied if we consider his methods of observation sufficient. From what replies of his subject did he recognise his radical incapability of thinking according to the space category. On what facts did he build up his conviction? Platner does not take the trouble to tell us this. The experiment, nevertheless, was a delicate one to undertake, and concerned facts so difficult to observe, that it seems as though it would be our right and our duty to ask for precise details. Platner was a disciple of Leibnitz and he had already published his sentiments about the problem of the perception of space. Is it not to be feared that he was influenced in his examination by his preconceived ideas? It was exactly on this very subject that he was having a public discussion with Schulz. Was that not, too, a circumstance little calculated to give him the open mind necessary for such a task? Anyhow, even if he did continue the examination of one subject only, for three weeks, an examination so delicate that a wrong term could throw him off the scent, was this sufficient for determining a conviction? At present, when one finds, easily enough, many blind subjects together in the schools, it is of course always a delicate matter but, at the same time, relatively easy to try Platner's observation again. Whoever experimented this would reject his conclusions (1).

(1). I do not ask what that mentality, absolutely foreign to humanity, could be, of a being with no notion of space. I will simply recall what we have already said about blind geometricians. How can we conceive of a geometrician who knows nothing of space? One may reply that certain savants have constructed geometries with two, four, or more dimensions, although they were incapable of conceiving of spaces different from the Euclidian space. But nothing can be concluded from their case, for

3.

Facts speak so clearly against them that Monsieur Dunan, in his remarkable articles in the *Revue philosophique*, in order to defend the nativist point of view against English and German empiricism, was obliged to modify it and to imagine a fresh solution of the problem. Undoubtedly, he said, those who are born blind also have the notion of space: the synthetic character of their representations does not permit us to doubt it. But nothing prevents us from supposing that their space differs radically from that of those who see. The only consequence of this hypothesis for us will be the obligation to admit that for those who see there are two spaces, the one realised, the visual space, which they use all the time, and the other virtual, the tactile space, of which they do not make use and which does not develop. With the blind man, as the visual space is lacking, the tactile space occupies its place, and groups all spatial representations.

The obvious force of such a theory comes from the fact that no comparison between the two supposed spaces can ever contradict it absolutely. These two spaces, according to Monsieur Dunan, are incompatible and cannot subsist in the same consciousness, so that they can never be confronted with each other, in order to prove that they resemble each other. How can a man born blind judge of the space of a man who sees, since he has not even the germ of this in himself? How could the man who sees judge of the blind man's space, since the germ of it within him has been stifled by sight? Do not hope that the man who becomes blind at an adult age

these savants acknowledge that if they did not imagine the Euclidian space, they could not have built up any metageometry.

will serve as an umpire : visual space has such superiorities over tactile space that when once one has learnt to make use of it, one never gives it up again, so that the progress of tactile space loses its chance.

I can understand that Monsieur Koslowski accepts Monsieur Dunan's opinion about the two heterogeneous forms of space, because, no doubt, not having frequented the blind, he refuses, after having accepted Platner's theory, to admit the synthetic character of their spatial representations. But Monsieur Dunan questioned the blind and he could not help recognising, in their images, the essential characteristic of visual space. His theory, therefore, appears to me entirely subordinated to metaphysical views, and I see nothing in the facts given by him which justify it, unless Monsieur Dunan means that a tactile sensation differs from a visual sensation, and certainly no one would contradict that.

« What man who sees, » asks Monsieur Dunan, « can pretend to have in his mind the tactile image of any space whatever ? »

Undoubtedly the man who sees does not usually have any tactile spatial representations. That may be certainly, as Monsieur Dunan says, because tactile space, being very different from visual space, is impeded in its development by the presence of this visual space. But it may also be due, and quite as likely, to the fact that they are identical and, consequently, tactile space is not distinguished from visual space. Does it not follow that with the man born blind, who, thanks to an operation, is able to see, the two representations of space should coexist for a time at any rate ? Monsieur Dunan recognises this. The fact that to space, such as the man who sees pictures it, is always joined colour,

which is the notion peculiar to sight, does not necessarily imply that his representation does not come to him *also* by touch. It proves, perhaps, simply that space being supplied to him more easily, and a thousand times more richly, by sight than by touch, the man who sees has fallen into the habit of uniting colour with every representation of this kind, even when this comes to him by touch.

Monsieur Dunan insists very much on the case of Monsieur Bernus, a Professor at the National Institution. He became completely blind at the age of seven and, although incapable of perceiving colours, he declared that he could not imagine the letters of the Braille Alphabet, which he read with his fingers, otherwise than as being coloured. I may add that twenty years after Monsieur Dunan knew him, Monsieur Bernus told me of the persistency of the same phenomenon. It would be easy to give other observations of the same kind taken from other subjects. But what is to be concluded from them? Undoubtedly that, on account of a few visual images from the years of his childhood, which were still floating in his brain, Monsieur Bernus could not have a purely tactile image of the Braille Alphabet. He continued, therefore, to make use of visual space. And according to Monsieur Dunan, from this it is natural to suppose that: « the visual forms of space remaining in the memory of a blind man, who has once seen, are constituted according to quite another law from those that govern the constitution of the purely tactile representation of space of the man born blind. If visual space subsists, it hinders tactile space from developing, in spite of all the circumstances favourable to it, and if, under such circumstances, it eliminates this, it is because the fusion between the two cannot

take place, so different are their natures.» Monsieur Dunan assures us that it is all in vain to seek for any other explanation. As a matter of fact, it would be in vain to seek for any other, if we admit *a priori* that there are two distinct spaces, and if we take care to put our conclusion into our premises. But if we do not set aside the most simple hypothesis, the one by virtue of which a common space is to be found in the notions of both sight and of touch, this would quite well account for the persistency of coloured impressions. In visual sensation, colour is constantly given at the same time as space; it is bound up indissolubly with that, and not only does it not impede in any way its perceptions, but it is one of the conditions of those perceptions and it serves as a support. What is there surprising if, after colour associating for years with space and after it has been the necessary element of all our images as well as of our sensations, the day when this is given to us without colour, we continue, by sheer force of habit, to associate the one with the other? This fusion is all the more comprehensible as Monsieur Dunan admits the incontestable synthetic character of the spatial representations of the blind and that, besides, in order to acquire this synthetic character, the tactile representation is obliged, as we have seen, to free itself of the tactile sensorial elements which accompanied it. It then appears naked, as it were, and seems to ask for a complement. There is then, perhaps, not competition between the two spaces, but harmony. They do not attempt to exclude each other, but to blend rather, one with the other, and to help each other.

Let us beware of rules drawn from one single observation!

It would, undoubtedly, be easy to find cases si-

milar to that of Monsieur Bernus, but it would not be any more difficult to find blind people who have seen for a few years, and whose mode of representation of space seems to be quite tactile. I say *seems*, for one knows how delicate these appreciations are.

Monsieur Dunan also cites, in support of his thesis, the fact that Monsieur Petit, one of the Proctors at the National Institution for the Young Blind, although he read Braille easily by sight, could not decipher it with his fingers.

« With those who see, » he says, « the tactile sensations only inform according to the exactness and distinctness of the visual images that they evoke. » Tactile images, with Monsieur Petit, did not coincide with visual images and could, therefore, only call these up in a confused manner. And this lack of coincidence is caused by the divergences which separate tactile space and visual space.

It is quite true that with Monsieur Petit, there was no coincidence between the tactile images and the visual images of the Braille Alphabet. But can the cause of this not be found elsewhere? The Braille letters are complex signs, and the dots which compose them are close together. The finger must be educated in order to be able to perceive these letters distinctly, and to form clear images of them. The best proof that the chief difficulty one has, in learning to read by the Braille system, comes from tactile sensibility, is that one usually triumphs over this difficulty by using, at the beginning, a text written in larger characters, with bigger spaces, composed of dots farther apart from each other and in more marked relief. Was it not this preliminary work, often tedious to adults, and for which he did not see the need, that stopped Monsieur Petit much

more than the supposed divergences between tactile and visual space. Whilst my forefinger reads fluently, I have great difficulty in distinguishing the letters with my third finger. Does it follow that the tactile space of my forefinger differs from that which it is given to my third finger to know? Not to leave the domain of facts, Monsieur Dunan may be sure that there are people, with their eyesight, who learn to read the Braille writing with their fingers.

I know one person in particular, who, believing that her eyesight was in danger, began this exercise preventively, and I do not think she met with more difficulties than most blind people of her age would have done.

Some blind persons have declared to Monsieur Dunan that they do not understand the apparent diminution which, by virtue of the laws of perspective, bodies undergo with respect to us, when we see them from afar. These persons proved themselves absolutely incapable of grasping the explanation he offered them on this subject. And Monsieur Dunan draws from these declarations, once more, the inference that tactile space is of a different nature from that of visual space. If the various testimony he has collected applied to all the persons born blind, I should still be inclined to contest the interpretation of it. But I dare venture to affirm that this testimony does not apply to all the persons born blind.

An intelligent blind person will readily understand that the farther objects are away, the smaller will they appear, and it is not only by argument that the blind man knows this. He finds something very similar in his own spatial representations. He feels less overwhelmed, so to speak, by his writing-table, when he imagines it at some distance from him

than close against him. I do not only say that he knows, after thinking it over, but I say that he *feels* that among the radiations which go out from him, fewer of them are stopped by the table in the distance than by the table near to him.

## 4

The blind are singularly surprised when people talk to them of philosophical theories which refuse them the notion of space, or which grant them a space quite different from that of those who have their eyesight. They are very much amused at this idea. Their amusement may be a sign of levity, or of high treason to philosophy, but they also wonder, and this may be a sign of common sense, how it comes about that no misunderstanding ever results from this in their intercourse with those who see. Monsieur Dunan judges, and not without reason, that their testimony is tainted with partiality. That may be. At any rate, I can certify that various persons, whose faculty of observation deserves some credit, and who frequent the blind familiarly, have assured me that they have not noticed anything in them which could lead to the supposition of so profound a difference between their mentality and that of other men.

I am, therefore, persuaded that sight and touch speak the same language to the consciousness that listens to both of them, and that the man who sees and the blind man understand each other really, and not apparently, when they communicate their ideas to each other by means of the words of space, dimensions, distance and form. I am convinced that they use the same space for their images, with

scarcely any difference other than that the space of the one who sees is always coloured, whilst that of the blind man is always apt to be laden with more or less keen tactile impressions.

Practically, at any rate, everything happens as though it were like this. It does not matter much, when all is said and done, whether people accept Monsieur Dunan's conception or ours. Practically, the only thing that matters is that the blind man, like the man who sees, should have a synthetic representation of space, supple enough to allow him to represent very easily to himself the forms of objects. With regard to this point, experience leaves no doubt whatever.

Everything happens as if, when the mind has finished the education of the senses and when it receives from them complete sensations, the same notion of space were given to it, both by sight and by touch, but freely and magnificently by sight, which embraces vast domains, in which appear, very quickly, the precious resources that it can draw from space as a means of co-ordination of its representations. This is given sparingly by touch, which only explores the immediate vicinity of the body and only amplifies its notion of space by giving this suc cessive characteristics, wrapping it round thus with hundreds of muscular impressions, the effect of which is to cloud it over. It seems as though the mind, anxious for action, and curious above all about the synthetic representations of forms, (representations which are the most necessary of all for action), transforms and refounds these sensations of the touch, in order to take away their analytical character and free the spatial element which is so important, whilst it preserves, in their integrity and utilises, under their rough form, the spatial

representations of sight, because colour, far from being an impediment for these representations, serves them rather as a support.

This is why sight is called the sense of space rather than touch. Sight gives space all elaborated, whilst touch supplies the elements required for elaborating it.

Who can tell whether this is not a mistaken, or at any rate a superficial distinction. Perhaps this work, that the mind does on the tactile sensation, in order to adapt it to its needs, it was also obliged to do, or a similar work, on sight, in order to perfect the visual sensation? If the eye of the child learns to co-ordinate its movements, complex as they are, it is because its intelligence requires the spatial representations with which it is alimented; and it is, perhaps, for the same motive, too, that the movements of the muscles of the eye cease to be perceived by the consciousness, and are quiet, in order to leave the field free for the images of space.

## Chapter XI

# VALUE OF THE SPATIAL IMAGES DUE TO TOUCH

Poor images, in truth, these images of the blind man that no colour relieves! I know it is difficult for the person who sees to picture them to himself. Perhaps, though, it would not really be impossible for him to get an approximative idea of them. Sometimes during a reverie, psychologists tell us, the visual image becomes slightly blurred. The colour of it becomes vague. In his *Experimental Study of the Intelligence*, Binet notes that one of his subjects declared that he saw a woman wearing a dress, and he could not tell what colour the dress was. Similar phenomena are not rare, certain subjects who are poor visualisers have told me, with regard to the representations of objects of variable colours and a form which does not change much, such objects, for instance, as pencils, chairs, garments, etc. It is true that in these representations the form, too, is often very vague. Let them give this more precisely, and let them extinguish the faint, vague, fleeting colour which subsists in these images. Let them try to imagine these two modifications (which the person who sees seems to think exclude each other), and I fancy that they would then have something which recalls a little the spatial images of the blind.

Such images will certainly appear poor to those

whose representations, sometimes, have such richness and such colouring. All which gives to the visual image its relief and its intensity is lacking in the images of the blind. Such images certainly could not individualise persons and things very strongly, and we shall see that we can scarcely count on them for evoking æsthetic emotions or sentiments. Their rôle is next to nothing in the affective life. In all cases where visual images are specially remarkable for the intensity of their sensorial contents, their natural substitutes will be images of another kind: auditive, olfactory, motory or tactile, in which the representation of space will be either missing or very insignificant, but the intensity of which is sometimes very great.

On the other hand, for the exercise of thought and for everyday needs, the representation, as a rule, has no need to be so rich in sensitive elements.

It has been shown of late years that the perfect images, which the old psychologists loved to study, only appear, by accident as it were, in the consciousness. For this absolutely theoretical notion of a photograph-image, the more true notion has been substituted of an image in perpetual transformation. We have just seen how the tactile image can differ from the tactile sensation: images of every kind are the object of analogous corrosive actions. They are always inadequate to the sensations, which themselves are inadequate to the sensorial contents of the objects. Our brain is a workshop in which they undergo an incessant work of degradation which undermines them progressively. With most men, impoverished and deteriorated images occupy, almost constantly, the scene of consciousness. This is even a *sine qua non* condition of mental activity, for it is only in this way that they

can easily enter into fresh combinations. The visual image does not only, generally speaking, lose part of its colour, it also loses part of its spatial complexity.

It has even been proved that it is sometimes entirely destroyed, and that the image seems to be much less necessary to the exercise of thought than was believed for a long time. The works of Binet and of Bennetts are very suggestive from this point of view. We very often think, without figuring to ourselves the objects of our thought, without aiding ourselves by any other sensitive images than those of the words which designate them. We have no exact representation, for instance, of electricity. We do not know what it is. We have only verbal or, so to speak, metaphorical images of it which are very rough. That has not prevented us from building up a science on it, and from entirely transforming human industry by it.

The more disintegrated the visual image becomes, the more easy it is to find substitutes for it. These substitutes, of course, vary very much, according to the individuals, and (as with those who see, and still more so than with those who see) what the consciousness contains varies according to whether we have to do with an auditive, a tactile or a motory subject.

Muscular images seem to me to hold a specially important place with many subjects, because of the difficulties which, as we shall see, sometimes delay the development of spatial images. The blind net-maker will frequently take up her shuttle mechanically, without representing to herself the table on which it was placed. These muscular images are so fleeting that it is difficult to study them. Their rôle, nevertheless, is very evident from examples like

the following. For several days I had been looking for a book, without being able to find the place where I had put it. One evening, when I was standing on a stool in front of my book-case, I suddenly remembered that my book was just there, on a shelf just within reach of my hand. In placing it there, I had make exactly the same movements that I was just making then.

I think, too, that words which do not evoke an objective representation find a kind of support in what one might call a subjective representation, in an ensemble of sentiments, more or less precise, which they call forth. What they contain is no longer entrusted to the sensorial memory, but to the affective memory, the rôle of which is susceptible of becoming very important. Certain embryons of unconscious movements seem to correspond very well with these sentiments. As these images have only real value from an affective point of view, I will speak more fully of them later on. We shall see that they are important for all objects which, being purely visual, escape any kind of representation for the blind. Their attributions are capable of extending, though, if the imagination is too lazy to apprehend objects which are susceptible of coming under its notice.

The words, lion, tiger, cat, flower, even when they are not accompanied by images, do not leave us indifferent.

Motory images of this kind, which play a more or less important rôle with those who see, according to their own particular imagination, are susceptible of taking a special development with the blind. It seems to me that it is rather by means of muscular images that the blind more often represent to themselves objects in motion. To believe, though, with

certain philosophers, that the place left free by visual images is entirely or almost entirely occupied by them, is ignoring experience.

Naturally the spatial images of touch, presenting the essential characteristic of lessened visual images, the one which wears away the least, namely space, although they may frequently simplify the outline, of this, are still the best substitutes. They have certain properties which allow them to aspire to this important mission.

2

The day when, with the methods of experimental psychology now used, a study of the imagination of the blind is undertaken, and when an inventory is made of the most familiar images of a few well chosen subjects, it will certainly be recognised that these said images are often somewhat vague. The cause, I think, is to be found less in the mentality of the blind than in the insufficiency of our special education. There are scarcely any blind schools, in France at any rate, in which care is taken to give to children, whose experience is limited by blindness, the equipment of representations necessary to them; schools in which they are encouraged to touch so many objects which life will probably never place within reach of their hands.

On the other hand, it will be proved, undoubtedly, that such representations will be engraved, without any difficulty, if not on the minds of all these blind persons, at least on those of many of them.

Herr Fischer, Inspector of the Brunswick Blind Schools, after an investigation which he undertook on this special point, met, as might very well be

expected, with a great variety in the representations of his subjects. The image formed of the same object does not differ any less between one blind person and another, than between one person who sees and another.

A tree was presented with all its degrees of complexity, from the simple, bare trunk to the most inextricable medley of branches and leaves. But his researches revealed to the observer, contrary to his expectation, the capital rôle played by spatial representations in the mentality of the blind.

« Surprising appeared to me for the first time, in all the observations, » he writes, « the preponderance of purely spatial representations, of representations of size, length, width, thickness, of the relations between the directions and position of different parts, of their disposition in space. Impressions concerning the qualities of the objects, such as ruggedness or smoothness, were rarely mentioned. Mistakes were often made with regard to substance, whilst spatial matters were very well known. Considering that the number and variety of tactile impressions are, of course, very limited, it is evident that the blind person, for his representations, gives the greatest importance to spatial matters. All things connected with space excite his interest to a much greater degree than other details, and are more firmly fixed in his memory. In a general way, I can say from my observations that, in the domain of touch, there are a great number of objects, of which the blind have very clear and distinct representations, which from the point of view of matters concerning space, are very little inferior to the representations of those who see, and only from the point of view of quality and intensity. »

I do not doubt but that a methodical enquiry

would reveal, among the blind, subjects whose spatial representations are preponderant. This type of blind person will perhaps be called the type visual-tactile. It will be seen that with them, objects leave the imprint of the form rather than any other. Personally, it often happens that I remember exactly the place on a page of one of my books of the title of a chapter, and even the place on the page of some word, whilst the qualities purely tactile of this title, or of this word, will not have left with me any inclination to recall it to memory. Twelve times an hour, a tram-car passes under my window. I only notice it by the squeaking of the wheels on the rails, and by the strident ringing of the bell which, each time, calls the passengers. If, however, I happen to think of this tram-car, the image presented to my mind is never the reproduction of these various noises, but the representation of the car itself. (1) Several blind persons have assured me that on hearing a horse spoken of, the word does not evoke in them a sound of neighing, or of four horse-shoes stamping on the ground in cadence, but the image of an animal, more or less characteristic, more or less distinct from other quadrupeds, according to the degree of knowledge of the person. They have, however, very rarely had the opportunity of touching a horse.

These images, too, often have the faculty of reappearing to the mind with extreme facility, and of

(1). These spatial images are so natural to me that, like those who see, but undoubtedly in a less degree, I sometimes represent to myself, under the form of schemes, abstract ideas or even sensations. To many blind persons, time appears as a straight line, along which one slides the event, the date of which one endeavours to find, until one discovers its right place. Often, too, for those who have a bad auditive memory, musical sounds have a tendency to appear as in a scale.

staying there sometimes for a long time. The blind man has them at his entire disposal. At college, among my fellow-students who could see, I attended all the geometry classes, without having a single figure in relief under my fingers. Our professor drew the triangles, polygons, or circles, which he required for his demonstrations, on the blackboard, mentioning each one as he drew it. I reproduced them mentally, putting at every angle, and at every point, the letters for designating them, and I then followed the lesson on my mental images This experience does not only prove the ease with which these images are revived and placed before the consciousness; it also shows their great clearness. It is true that, in this particular case, it is only a question of geometrical, and consequently regular, representations which, relatively speaking, are not very complex. The demonstration sometimes required the addition of supplementary lines, which complicated the figure. I must own that objects of fanciful form, or with a great deal of ornamentation, have always a tendency to be brought back to geometrical forms. But for certain blind persons, many images which have not the regularity of those of which I have just spoken remain perfectly distinct, nevertheless. There are many objects which they rarely have the opportunity of exploring by touch. They have the representation of these objects within themselves for many years, sometimes, without time altering it very much. It is a mistake to think that the image always gets more distinct by being confronted frequently with its object. If it should be a question of an individual image, by replunging it in the real, its distinctive characteristics come out, of course, very clearly each time, and this gives to it a fresh youth. But for generic images, which do not

correspond to a determined object, but to a group of objects, it is quite different. As one multiplies the experiences, the representations acquired contradict each other more, and the characteristics, opposed in this way, destroy each other, so that the image has a tendency to become poorer and poorer until, finally, it is no more than a scheme with vague outlines.

3

These spatial images of the blind man, incomplete though they may be, are destined to play a very considerable rôle, frequently, in his mental life. Their essential quality is the ease with which they are formed, reproduced and preserved. They become the link and, as it were, the support of countless associations of ideas. Through them, the idea of the object awakes in us hundreds of ideas, images, attitudes concerning its utilisation, consequently ideas, images and attitudes essential to the agility of thought.

Other images, sonorous or tactile ones, for instance, do this work much less perfectly. A piano interests us specially by its auditive qualities, but most objects attract our attention chiefly on account of their form. It is in their form, determined by their finality, more than in all their other sensitive qualities that the ideas of their practical applications are involved, and it is, therefore, with their form that these ideas are associated in the most natural manner.

In a cupboard, a plate, a chair, an arm-chair, the form of the object is essential. They could not be utilised, or at any rate they would only serve very imperfectly for their respective functions, if they were of another shape. It is the same with the great

majority of objects. It is for this reason that if I think of a tram-car, its shape comes to my mind and not the noises by which it usually strikes my ear. These noises are useless. They are accidental and superfluous, the ransom paid for the advantages which we expect from the tram-car. The form of the carriage, on the contrary, regulates the use I can make of it. Even the piano, for anyone who is not musical, is interesting as a piece of drawing-room furniture more than as an instrument of music, and that, thanks to its form.

This then is one of the reasons why, with those who see, visual images are so strangely preponderant, why all their life is organised around visual impressions. The same cause ensures to the spatial representations of the blind a capital rôle, and it is for this cause, that if deprived of these representations, their thought would lose much of its agility and of its practical character. One example shows very clearly their importance in mental life. Herr Burde and Herr Stern, in the interesting investigations given in their pamphlet entitled *Die Plastik des Blinden*, note that during the years of childhood the intelligence increases, usually, in direct relation with the faculty children have of representing objects to themselves. This parallelism is due still more, it appears, to the action of the representations on the intellectual development than to the inverse action of the intelligence on the development of the representations. It ceases, undoubtedly, with instruction which brings into the abstract elements of thought an essential factor. Later on, the blind man's faculty of multiplying and varying his activity seems to grow with his faculty of representation.

4

Quite as much as thought, everyday action is facilitated by this faculty, as without these spatial images, the perception of objects would be of desperate slowness. The great impediment of the blind man for acting on the outside world is the poverty of his sensations. Spatial images act as substitutes for these.

If, in order to recognise a chair in the piece of furniture placed near him, the blind man were obliged to explore all parts of it, to feel all its lines, he could not sit down until after a long piece of work. Fortunately, in practical life, he is rarely obliged to build up tactile representations of the objects that he wants to perceive. Spatial images come to the rescue and save him this. If I put my hand on a piece of furniture that I know, on my writing-desk chair, for instance, the entire arm-chair immediately comes to my mind's eye, with its high back, its two protruding ears, against which I can rest my head, its deep seat and all its peculiarities. There is no need even that the initial sensation which evoked the whole chair should give me now a representation of form. If I just touch the arm as I pass by, with the tip of my finger, for instance, or with a cutaneous surface too limited for a characteristic dimension to be given to me, I recognise merely the coldness of the leather with which the chair is covered. But this tactile sensation from the leather is associated itself with the form of the arm-chair. This very often suffices for evoking it. If it is a question of an arm-chair that I do not know, in a drawing-room which I enter for the first time, things take place in nearly the same way. The arm-chair representation which takes place will be inexact, though, and ar-

bitrary. It will, nevertheless, generally suffice for guiding my movements, for indicating to me where I am to sit and that I must, perhaps, move towards the left, in order not to knock against anything. It will be an ordinary arm-chair, a typical arm-chair, as it were, one that serves for any house, modified only according to the tactile element that the present sensation gives me, and which teaches me, according to the place where I lay my hand, whether the back is low, the arm wide, or the seat well cushioned.

The blind perceive thus, nearly always, by means of their mental resources. They live on the past, on their accumulated provisions. There are blind persons who are not naturally very inquisitive and who content themselves with what they already have, and never think of acquiring fresh representations. They can pass months, and even years, perhaps, without attempting a single, methodical, tactile exploration. If they happen to come across some fresh object, they build it up from their old representations, which they put together according to indications given them.

This faculty, which philosophers designate sometimes by the barbarous, but convenient, term of stereognostic faculty, is not, of course, peculiar to the blind. Those who see have it also. The study of certain pathological cases has made it better known. Its seat in the brain has been determined approximatively. There, associations seem to form between the different tactile impressions which an object gives, on the one side, and, on the other side, between these impressions and the other qualities and properties of the same object, so that one of these qualities being given, the others are at once evoked. In the case of certain cerebral lesions, these associations may be broken and the object

touched is no longer recognised. This is what is called stereo-agnosis. At other times the object is recognised and named, but the patient has lost all idea concerning its use. The associations between the images representative of the object and the images which correspond to its practical applications, to its finality, are intercepted.

This is what is sometimes called apraxis.

For the blind, although, as far as I know, no case of stereo-agnosis or of apraxis has yet been studied in them, things evidently happen in the same way as with those who see. It is also thanks to associaions between the cerebral cellules interested, cellules which seem to be different for every hand, that the sensation of one of the qualities of an object awakens, in the consciousness, first the representation of that object and then the idea of its practical applications. The essential difference between the blind man and the man who sees lies in this, that with the man who sees the image called forth is visual, attached undoubtedly to the centres of tactile impressions, and it is by the visual image that the images of action are evoked, whilst with the man born blind no visual element intervenes.

The blind make use much more constantly than those who see of that stereognostic faculty which commands their action. They owe to that those reserves of images which enable them to dispense with drawing all the time on the real for their spatial representations. The real is very difficult to explore, so that with the penury of their sensations, they count on these representations for alimenting their thought and their activity.

Perception, say modern psychologists, is the process by which the mind completes an impression of the senses by an escort of images. For no order

of perceptions is this so manifest as for the perceptions of touch. As the perceptions of this sense are particularly slow to acquire, it calls, more than the others, for the collaboration of the mind. We have already seen what a work of transformation the mind makes the tactile notions undergo, in order to make spatial images of them. We can affirm this time that in ninety-nine cases out of a hundred, without waiting for the long procession of these tactile notions, it is the mind which builds almost entirely the tactile perception, by means of these images which it has put aside in reserve.

## 5

This creative work of the mind is incessant. Besides the images of special objects, it engenders and maintains in the thought of the blind a concrete representation of the immediate surroundings in which he plunges. It is a mistake to imagine the blind man as isolated and shut up, as it were, within himself, separated from his surroundings, or only united with these now and then, thanks to tactile and auditive impressions which, on account of their nature, are intermittent. As a matter of fact through his representations, he is in constant contact with his surroundings. He feels himself enveloped by a concrete and perpetually sensitive space, which stretches out on all sides around him. In the same way, the man who has his eyesight, on shutting his eyes, sees within himself the objects which surround him. He continues in thought moving amongst these things. He feels, in his physical being, the connections, the invisible bonds which unite him with familiar things.

The blind man, in his study, feels around him the presence of his desk, his chairs, his arm-chairs, his chimney-piece, his book-case. He is affected by them. His state of mind in this room is not the same as if, for instance, he were in his bed-room. Independently of sensation, and simply through his imagination, he is all the time under the influence of his surroundings.

It is this concrete space, which is animated every second by noises perceived by the ear, or contacts of the foot, arm or hand, making the image of a certain spot, or of a certain object, stand out against the background common to them all.

Its dimensions are very variable according to the individual, and even with the same individual according to circumstances. In a room, provided that its proportions are not excessive, he has, generally as far as the four walls which constitute for him a natural limit, land-marks which are often very valuable as he gets a concrete reality from the objects of fixed forms which furnish it. In the street, the walls of the houses only limit it on two sides and sometimes only on one. Out-doors the vacillation is greater. The blind man has his horizon just as the man who sees, but the horizon of the blind man is much nearer than that of the man who sees. It is also more unstable. In a well-known place, where all the persons are familiar to him, a place where the blind man has often been and which is, as it were, imprinted in his muscles, in a garden for instance, the horizon has a tendency to widen out.

His attention, too, being given forcibly to a certain object placed beyond his horizon, may extend to it. Every minute, a noise which strikes the ear may bring this boundary nearer or drive it farther back. The importance of the sonorous sensations is capital in

extending or diminishing, ceaselessly, the concrete space with which the blind man feels himself enveloped. Very often it seems to me that I am describing around the observer a circle of eight or ten yards radius. I scarcely need to add that this is a very approximative measure.

The way in which the imagination of the blind man takes possession, as it were, of the place in which he moves about is of capital interest. It is generally of great use to him for guiding himself. At any rate, those who are the most skilful in finding their way about are of this opinion. The blind man is not guided, when walking, by mere associations of impressions which come to him one after the other, one movement leading to the next, such and such an object reminding him of another one associated with it in his consciousness. An entire representation of the whole commands each of his movements, each of his steps. He has, within himself, a map of the places that he is passing through. All the obstacles, the various ups and downs of the road, are marked on this map. He sees them as a whole and then takes them one at a time. He watches, as it were, his own image moving from one place to another on this mental photograph.

He must, therefore, make, and carry about with him, plans of all the places he frequents.

Needless to say that he does not figure to himself his whole town in one single picture. So complex a sketch could never be inscribed on his imagination. A man with his eyesight, whose images are much richer, would be incapable of seizing all the details for such a picture. Alfred Binet has shown us that the famous chess-players, who play twenty games at a time without seeing a single chess-board, have no concrete representation of the twenty games they are

playing. They have, rather, schemes, which they can, if necessary, unrol as images. In the same way, the blind man knows his town rather than pictures it to himself; but every second he is adding a fragment of it as he advances, the fragment necessary to him for his orientation. Of this global image, which he only has as a power, he detaches, bit by bit, the pieces as required.

The rôle played by space, as imagined by the blind, for a help in guiding themselves, is generally less appreciable in the street, where their representations are almost necessarily poor and approximative, than in houses, where the least objects are so well known that their images can acquire very great richness and precision. The blind man makes use of his images for directing the movements of his arms, of the whole of his body, and for contact with the objects near him. Spatial imagination helps very considerably the development of physical activity, some aspects of which we have studied and, on that account, it is one of the most valuable faculties of the blind man, one of those which he ought to cultivate with the greatest care.

## Chapter XII

# THE CONQUEST OF SPATIAL REPRESENTATIONS

### I

If space for the blind man has the same essential characteristics as space for those who see, it is very clear that this has been acquired by very different means, and that its conquest has only been made at the cost of work that has taken a long time. I have considered it, so far, under its most perfect form. It is not developed, though, in all individuals to the same degree, and the services that it renders vary with its development.

The man who sees possesses a special organ, provided for the purpose of procuring for him the free constitution of space. A relatively free play of muscles, combined in a system for this purpose, has only to be worked, in order to give him, mechanically, the perception of height, width and depth, in the measure needed for perceiving them. After a relatively short apprenticeship of adjustment of these different muscles, he is master of that portion of space which will be the domain of his imagination.

The muscles and the organs which the blind man is to use are, on the contrary, not combined in a system. He must choose, among so many move-

ments that he can execute, those which may serve him. If this choice be relatively unvarying, if all the blind make use of almost the same movements in exploring by touch, it is that the same law of the least effort guides them all in their selection. They have none the less to learn, and often with great difficulty, how to co-ordinate their movements, to interpret them, to build up with these elements a portion of space vast enough for practical needs and for the needs of thought. It will readily be imagined that this work is not carried out by all of them with the same degree of finish.

With those who see, the eye helps so powerfully the development of the sense of touch that all the difficulties of the latter are not realised. With some of the more intelligent and more skilful of the blind, the necessary work is done almost unconsciously, during their childhood, so that they, too, do not realise all the difficulties there are for the sense of touch. The blind whose development has been delayed give us more useful indications. I have already spoken of those children who enter our special schools at the age of eight, or ten, and do not know how to use their limbs. They are frequently incapable of getting any exact ideas after feeling the various objects given to them. Put a doll, made of india-rubber, into their hands, for instance. They will turn it about in every way, mechanically, and tap it with their fingers automatically. Their movements are not guided by any aim or object. Their fingers seem almost lifeless. It is manifest that they are not exploring. Qualities of roughness or smoothness seem to interest them sometimes. Sometimes, also, they seem to pay attention to any sounds that they hear from the object, either caused by their fingers, or by its fall

from their fingers to the ground. The form of the object does not interest them. One has to arouse their interest, to oblige them to do things for themselves, in order to get them out of this torpor. It would not be sufficient to simply make them perform methodical movements. They might execute these without getting any profit from them. It is from themselves, from their needs, and from the good effect that these needs will work in their intelligence, that the marvellous power must come which will give a sense to all this mechanism.

A complicated psychological work is necessary for them. For touching an object, it is not enough to place it against any cutaneous surface, on the flat of the hand, for instance. The various spots of the skin which enter into contact with the object are affected by it, certainly, and from the perception that we have of the surface affected we can deduct indications as to the form and dimensions of the surface applied. But these indications, as we shall see, are generally vague.

Then, too, the object to be examined has different sides. We must know the relations of each to each. It is often, too, of a complex form. It is, therefore, necessary to bring the fingers into use and the hand itself for exploring and holding the object. The knowledge we shall then have will not be only obtained from the surface of the skin affected, but from the consciousness that we get of these active and passive movements, from the position of our hand and the resistance offered to our muscular contractions. All these sensations, we are told, are chiefly perceived in the articulation nerves, (1) but

(1). This is the opinion generally admitted, according to Goldscheider. A different opinion, anterior to that of Goldscheider, is defended by M. Bourdon in *L'Année Psychologique*.

there are also indications which come from the tendons and from all the sensitive elements of the periphery; particularly from the parts pressed by the objects. Here then are plenty of data for blending together. And if the object should be too large to hold in the closed hand, the phalanx articulations and those of the wrist would not suffice. The elbow and shoulder articulations and perhaps the movement of the whole body would be added. It might be necessary to walk a few steps, in order to examine the object as a whole. The exploration is then very complex and the psychical process very mysterious, as it must not only co-ordinate all these varied elements of consciousness, but also translate them into a single spatial representation.

German psycho-physiologists who have endeavoured to analyse this psychological process have been so strongly impressed with the sentiment of its complexity that they are sometimes timid in following the transformation to the end, in recognising fully the unity and the richness of the psychological synthesis in face of the enormous quantity of physiological actions and reactions. As it frequently happens, the observation of the physiologist disturbs the observation of the psychologist and prevents him from seeing all the originality of the psychical reality, as the latter cannot be reduced to mere movements. They are sometimes tempted to enclose within too narrow limits the spatial imagination of the blind. This is the chief reproach that I shall have to make to the instructive book by Th. Heller, which, with the works of Lotze, of Schuster and of Hocheisen, will help us in the following analysis.

1907. Whatever the theory adopted, the complexity of the problem remains the same.

2

The sense of touch, spread over the surface of the body, the whole of which gives tactile indications about the outer world, is specially developed in the parts which unite, in the highest degree, the two essential elements of touch which we mentioned just now, the mobility and the skin's sense of place, that is to say the faculty of recognising as distinct two excitations very near together. The skin's sense of place varies with the richness of the tactile organs, the mobility varies with the richness of the motory nerves. Now the places of the body in which there are the most tactile nerves are also those which have the most motory nerves, an arrangement singularly propitious for the sense of touch.

The tongue takes first rank for this. It is an organ of marvellous agility, in which physiologists have recognised the keenest sense of place of the skin : points separated by scarcely a millimetre are perceived as distinct.

The red edge of the lip is also very sensitive, and that is even one of the reasons why children have a marked tendency to put all objects up to their mouth. Unfortunately, these organs, the tongue and the lips, move in too restricted a space, and as it is absolutely impossible for them to envelop objects, they are not of much use for the purpose in question. The hand is much less sensitive than these organs, as it requires separations of from two millimetres to about a centimetre, three centimetres even on the back of the hand, but for its utility with regard to sense of touch it is infinitely superior. The freedom of action given to it by the three articulations of the phalanx and the articulation of the wrist, a freedom

which is increased by the movements of the elbow and the shoulder, give it an absolutely unique rôle as an organ of tactile perception of space.

This is not all: the pulp of the finger seems to transmit tactile excitations with a greater rapidity than any other part of the cutaneous surface. The tip of the forefinger has been submitted to a thousand vibrations a second: these vibrations have been distinctly perceived by the brain. Elsewhere vibrations at a speed of five hundred a second are confused with each other, and perceived as a prolonged sensation.

The blind man uses his foot a great deal as a feeler when walking. In special instances, and for perceiving delicate shades, some blind persons have recourse to their tongue and lips.

A girl in the Vienna Institution used to dissect flowers in this way, during the botany lesson, and could then get an exact idea of the anatomy of the different parts. Such work is too subtle in most cases for the fingers, but all the attempts made to develop the tactile apparatus of the mouth in this direction have not had much success. The hand is almost the exclusive instrument for building up spatial representations. Every time the blind man comes into contact with any object, he puts his hand on it, as it is only the manual representation of it that satisfies him.

## 3

Objects which are not larger, or scarcely any larger, than the hand, those which are limited to what we may term manual space, and which have not any details too minute to be perceived by the pulp of the fingers, are those of which the blind man

will most easily build up exact representations. They will only require a minimum of intellectual effort. The intellectual effort is, nevertheless, very evident. By following this work of touching and feeling, we shall see, later on, its results. We must first, however, examine the tools which the hand has at its disposal.

Each of the two essential elements of touch, passive contact and movement, has been in its turn magnified by psychologists. They have been pleased to distinguish between a synthetic touch and an analytic touch. The former, according to them, is the one which results from the simultaneous application of different parts of the hand on the surface of the object; the other is the one that we owe to the movements of our fingers, when, only having one point of contact with the object, the fingers follow its outlines. And, thereupon, certain psychologists will assure us that the analytic touch is the one that the blind nearly always employ. Another psychologist, on the contrary, tells us that the analytic touch, alone, cannot even tell us whether a line is straight.

These are quarrels of the various schools. As a matter of fact, in order to explore by touch, no blind man would be satisfied with merely coming into contact with one spot of the proposed object. The pulp of the finger spreads out; it corresponds to several points of contact, to the six dots of the Braille letter, for instance, which it perceives simultaneously.

The movement made then, for the purpose of feeling, is always accompanied by a more or less extensive contact. Then, too, inversely, the blind man is never satisfied with an extensive contact: he always feels the need of having a more exact

notion, by means of more or less numerous movements.

From this double point of view, the pulps of the forefinger and the middle finger together form a tool of precision of the very first order. The pulp of the third and the fourth finger may be added, but they are less supple and less sensitive, although very superior to the rest of the hand. The surface thus obtained is of a relatively large extent and, at the same time, it has the property of being able to divide itself into fragments at any minute, allowing each of its parts, thanks to their relative smallness and mobility, to slip into all the various turns and windings, and to follow all the parts in relief. Thanks to this faculty of the fingers for uniting or for working independently, surfaces are recognised with extreme rapidity.

The thumb, on account of its position, only collaborates awkwardly in this work. On the other hand, thanks to its property of being placed opposite to the other fingers, it serves for constituting a second apparatus of precision which is, also, of great importance. By placing itself opposite to the middle finger or to the forefinger, and frequently opposite both together, it measures the dimensions of the objects, or of portions of the objects, which are, as it were, encircled by this compass. To form an idea of the precision with which it performs this function, we have only to remember that in paper warehouses, it is according to the thickness that the sorters divide and class the paper, and that they arrive at distinguishing sheets of 40 centimetres from 60, the difference of weight between which is only one gramme. It will be seen from this how small the difference of thickness is between them. Undoubtedly such exactness as that can only be met

with when the branches of the compass are only separated very slightly. This precision diminishes as the separation increases. It is always great though and the utility of this measurement apparatus never fails. It is by virtue of this faculty, that the blind man can judge very exactly the relation between various lines. By following simultaneously two lines, one with the thumb and the other with the middle finger, he can perceive, with marvellous precision, their least divergencies, or their least convergencies, and consequently their parallelism.

Line holds so considerable a place in the drawing of bodies, that one can imagine the capital rôle played by such a tactile apparatus in the formation of spatial representations.

Its value is due chiefly to the exactness with which the relation between the movements made on the two opposing organs is perceived. But, these two organs, being furnished with extensible pulps, we must remember that the blind man can judge of the surface as well as of the relation between the lines and that, at the same time, he explores these surfaces on their own account and judges their respective positions.

But more often than not, it is advisable to begin by enveloping the whole object with the hand. The two hands can be placed together, leaving between them a cavity, larger or smaller according to need, in which the objects are entirely encompassed. In this case, the variety of articular movements which the consciousness blends into one unique representation is much greater. One can realise the difficulties that may accompany this by placing in one's hand, one after the other, two cubes of the same dimension, one of wood and the other of paper. Generally the cube of wood is judged to be smaller

than the other. This is because the effort called forth by the resistance that the wood offers to the muscles makes the movements of the hand, closing over the object, appear of greater extent, so that the dimensions of the cube seem smaller to the consciousness. Practice, however, triumphs over these difficulties. What is more serious, as regards the exactness of representations, is the fact that the farther one gets from the tip of the finger, the skin's sense of place becomes less and less subtle.

It is easy to prove this by an experiment. Let us place the two points of a compass on the pulp of the fingers at some distance from each other, 2 or 3 centimetres, for instance. Now let us bring them forward quickly, in a parallel way, as far as the wrist. We shall have the illusion that they are converging towards each other until they join each other completely. The consequence of our experiment is the proof that exploration by the hand is necessarily vague and that it is unequally vague. We can only expect then, from the hand, rather vague information regarding the form and dimensions of objects. In order to get a better idea of the representations given by it in a too summary way, the observer instinctively has recourse to the two means which we have described and which work conjointly.

It would certainly be simplifying reality to say that exploration by touch of an object of small dimensions is done at two separate times. The first time the hands get a general representation quickly. The second time, the fingers explore the details. The blind man does not bind himself to follow any determined method. Circumstances, as well as habit or individual fancy, may cause him to vary his movements very much. All special methods, though, have a tendency towards this or-

dinary one. The progress here is seen in a better distribution of the work between the palm of the hand and the finger tips, and particularly in a more and more marked tendency to use instruments of precision and in the increasing skill with which they are employed. Even for exploring objects which greatly exceed the surface formed by the four pulps, very often the blind content themselves with their fingers and do not use the palm of the hand.

## 4

And since, as we have proved, the development of the blind man's touch is not manifested in an increasing keenness of the skin's sense of place, there is every chance that it is manifested in the other element, in the movements which accompany contact. There, it is of an essentially psychological order: consciousness directs the movements of the limbs in an ever better way, in order to arrive at results that are more and more clearly perceived.

The passive movements of the muscles are only conscious ones when they are not inferior to a certain limit which varies with muscles just as with individuals; and that one calculates by examining the angles described by the articulations interested. (1)

Hocheisen thought he had established, by nine thousand observations, that for the same muscle it requires a less large angle for perception for the blind man than for the one who sees and that, consequently, a clearer and a more intense con-

(1). Goldscheider was the first to study this question with precision. He found out on each one of his articulations, the minimum angle for which there is sensation. This has been called the threshold of consciousness.

sciousness accompanies his passive movements, and therefore his active movements also, the positions of his limbs and the contractions provoked by all exterior resistance. It can easily be imagined how great the value of such sensitiveness would be for the translation of the muscular movements into spatial representations. This progress, according to Hocheisen, is due to exercise, and comes from the amount of attention which, by the sheer force of things, the blind man gives more liberally than the one who sees to movements which are so important for him. Hocheisen's thesis does not appear to me to be experimentally proved. (1) His observations were only taken from eight blind subjects, which is evidently an insufficient number, all the more insufficient as individual differences, in this matter, appear to be considerable. By way of hypothesis, however, it is not negligible and it may, perhaps, be confirmed some day.

What is manifest, in any case, is that the movements of feeling by touch are carried out, generally, by the blind with much greater rapidity than by the man who sees. This is the effect of a habit contract ed under the command of a psychological force. The speed of the movements helps, in a remarkable way, the action of memory and favorises the blending of successive elements into a simultaneous spatial representation. It is, perhaps, necessary for this.

(1). In the first place, when Hocheisen supposes that the measure of motory sensitiveness acquired by experience may be indicated by the degree of speed which each subject attains in the reading of Braille, he is certainly mistaken, for in the reading of Braille movements are reduced to the minimum : the better one reads, the fewer still the movements. The Braille letters seem to be perceived by the sensitiveness of the skin much more than by the sensitiveness of the articulations.

At the same time as they get more prompt, the movements have a marked tendency to become automatic, the one leading to the other mechanically, reducing in this way, more and more for each one, the rôle of the will and of consciousness. Ask a blind man how he sets about exploring an object, and it would puzzle him to tell you. He is incapable of giving you the information you want. Insist on it, ask him to lend himself to an experience and to touch an object, as slowly as possible, in your presence, to let each of his movements be very deliberate, so that you may observe them. You will often see his hand hesitate and then move about in an undecided way. It will make very different movements from those it is accustomed to make. It wants to be left to itself and to move about in its accustomed way. What happens is very similar to what one notices with a pianist. It seems as though the movements are made by themselves. The will only appears to intervene for giving these movements their start. It can, of course, at any second take up its right again, and that warns us that the consciousness of every special movement is not abolished. It has simply held back in order to make way for the consciousness of the end in view, which alone, from henceforth, is distinctly thought of. The movements are no longer perceived except as in relation to that end, and as elements of that end. An imperfection in one of them is felt not as such, but as an imperfection in the total representation. It is then for the benefit of the representation that the economy of psychological forces is made, as well as all this improvement of the physiological work, and we recognise here the usual effects of finality.

It is, undoubtedly, in the same way that certain vibrations can be explained, vibrations that are

absolutely unconscious ones and which escape that action of the will which accompanies touch with the blind. Czermak, Hocheisen and Heller assure us that they noticed vibrations of this kind during their experiments. They are characteristic of the blind man's touch. There have been too few precise observations, as yet, to allow of our affirming this. The most likely hypothesis is that we see, by these vibrations, that the will can no longer stop the residue of voluntary movements. By following up a manual contact of any kind with the necessary movements for determining it exactly, by exploration of the fingers, the blind man has developed, in his hand, a sort of tendency to reproduce the movements mechanically. Besides this, there is a degree of intensity in the pressure which is particularly favorable to the formation of a distinct representation. With less intensity, the tactile sensation lacks clearness; with still more, the intellectual work is disturbed by an impression of suffering. Movements that are frequently imperceptible are made for the purpose of increasing or diminishing the pressure, in order to arrest it at the most favorable degree of intensity. These movements, by their very nature, are closely akin to instinctive movements, and because of their feeble extension, they are, it seems, more specially susceptible of becoming autonomic, of taking place (1) without the intervention of the will, and even in spite of the will. It is possible, then, that we see in the palpitations of the skin, observed by Czermak and by

(1). This opinion finds a striking confirmation in a very interesting article by Mr Van Biervliet *The Touch and the Muscular Sense*, published in *L'Année Psychologique* The author, from utterly different observations, and knowing nothing of the facts mentioned above, also concludes on the production of automatic movements which favorise tactile sensibility.

Heller, the same work, but in a more advanced degree than in the voluntary movements. Automatism, this time, is so complete that movements escape the control of consciousness. However it may be with regard to this question, about which we are so far insufficiently informed, the organisation of tactile sensations by consciousness already appears in the exploration by touch of objects of small dimensions. It has, perhaps, for effect, the lowering of the threshold of the consciousness of passive movements, so that the slightest movements may be perceptible and therefore utilisable. But above all it has its principle in the subordination of sensations, and of the movements which accompany them, to a finality, to the production of a synthetic representation of the object to be perceived.

## 5

The task of the intellect will be more complicated if we pass from manual space to what we may call brachial space. In order to explore this, movements of the arm are required and no other movements.

The general appreciation of dimensions and the approximative representation of form, which must precede the examination of detail, now present more difficulty. I do not forget, of course, that the blind man has a very valuable tool at his disposal. His two hands, placed opposite to each other, can judge of parallelism, of the convergence or divergence of lines and surfaces, in the same way as his thumb and forefinger judged them a little while ago. I am also of the opinion, whatever may have been said to the contrary, that the blind man can, without serious difficulty, establish a relation between

measures taken thus in the brachial space and those that are given him in the more limited space, the exploration of which only requires the hand and the fingers. The domains of the two spaces, the manual and the brachial, are not cut off from each other. The hand will often touch objects which appear to be out of its reach, but, by means of a few movements, it can trace all their outlines. Inversely, very often the blind man judges, by placing his hands opposite each other, dimensions which belong to the manual space and which he can judge with his two fingers in the same way. Still more, even for the exploring of the smallest objects, both hands are generally used at the same time. The measures thus supplied by the measuring apparatus of the brachial space are mingled with the measures supplied by the measuring apparatus of the manual space and are verified by it. An intermediary bi-manual, spatial field could be distinguished between the manual field and the brachial field in which both are mingled together in a way. In this manner, the instruments of the manual space serving in the brachial space, and the instruments of the brachial space being used in the manual space, a relation (1) between the measures taken, in both ways, must be easily perceived,

It is very evident, though, that the apparatus of precision for the brachial space is very inferior to that for the manual space. The chief difference is that with the former it is not possible to envelop the object completely, to cover the whole of its surface simultaneously. The sense of touch of the

(1). It is not a question here, of course, of any thing expressed in figures. The same as for those who have their eyesight, the numerical evaluation of this is a very complex operation, of which we do not need to speak here.

arms is very much less keen that of the hand. Then, too, the arms are generally covered with sleeves. The information obtained from the arms, with regard to the surfaces they have touched, is lacking in precision. They can only, as it were, throw a belt round the object, but they cannot judge of the whole surface. It is on this account that the blind man requires to take measures in every sense, to execute a whole series of movements, and to translate them into representations, before judging the form and dimensions of an object.

The difficulties are still greater for him when it is a question of a more exact representation and an acquaintance with details. Thanks to the rounded form of the head of the humerus, which allows very free movements to the articulation of the shoulder, the backward movements only being limited, the tactile field of the arms is constituted as nearly as possible by two half spheres which have, respectively, for their centre the shoulder, and for spoke the arm and which are divided. The articulation of the elbow, by joining its movements to those of the shoulder, gives the hand the faculty of reaching any spot within these two half-spheres. The hand can then explore each part of the object, since it alone is capable of supplying a precise representation, and we are thus brought back to the conditions of touch which we found in the manual space. This time, though, the exploration is a very long one. Every part has to be considered separately. The total image will result from the juxtaposition of all the partial images in the frame which was given us just now.

This juxtaposition is not at all beyond the powers of the imagination, as some persons have declared. Helped by experience, which supplies a great number

of points of comparison, it is perfectly well able to enlarge or diminish objects and to build them also with additional pieces. But I certainly own that, for these transformations to be possible, there must be intellectual work, a great deal of judgment, and a fairly great agility of imagination. The habit of touch places this faculty more and more at the service of the spatial representations which practical needs require. In the dimensions of brachial space, though, as will readily be conceived, movements, on account of their complexity even, do not reach so high a degree of organisation as in the limits of manual space.

For these reasons, the blind man more often contents himself with a very approximative study of objects. He can frequently do this without any serious inconvenience. Many objects are either of a geometrical form, or of a generic design, which is repeated a more or less considerable number of times. A child's hoop, for instance, is a circumference. A wardrobe is reduced to a series of horizontal rectangles, all like each other. When he is in the presence of objects of this kind, the blind man simply examines one part and then constructs all the others in the image of that one. At the most, he will pass his hand quickly over the whole of the piece of furniture, in order to verify quite approximatively the correctness of his construction. In order to picture to himself the inside of the wardrobe, he will count the number of shelves, and he will only examine one of these in order to build the others according to this pattern. But there, too, in order to be sure of the concreteness of his sketch, in order to realise it, to pass from the idea to the representation, a certain development of the imagination is necessary which is only acquired progressively.

In order to explore conscientiously objects of whimsical form, great patience is necessary as well as a capability for special synthesis. Instead of an exact representation of such objects, the blind man is always rather inclined to content himself with a more or less poor, and more or less wrong, image of it, which will then take the place of the real thing.

He will bring the object back to a geometrical form and despoil it of all its ornaments. Or, starting from one of its parts, he will construct it according to this particular part, keeping very nearly to its real dimensions, but lending to it imaginary details. If he has not much imagination, he will content himself with noticing this or that peculiarity which will stand for him for the whole object, and his imagination will not trouble about filling the frame with which his arms supplied him, and making for himself an approximative representation, equal to the one he had when he encircled the whole object.

If we now go beyond the brachial space, the dimensions of the object will become larger and the difficulties we have just indicated will increase. Among these difficulties are the vagueness of means permitting the blind man to judge the dimensions and the general form; then, and above all, the slowness of the exploration of details, and increasing complication for the work of synthesis.

We must not forget, and it is only too often forgotten, that the blind man finds, in his whole body, terms of comparison and, as it were, measuring rods. The height of many objects is given to him, as to many persons who have their eyesight, by comparison with his own height. The global representation of an arm-chair is facilitated for the blind man by the fact that he sits in one. He covers

it with the length of his body, and muscular sensations engrave, as it were, in him its dimensions. It is none the less true that increasing complications open wider and wider the doors for wrong representations. Their variety is infinite and, if one does not keep close watch, a very natural laziness may cause the blind man's brain to get furnished with spurious images, which would cause him to live outside reality.

## 6

It now remains for us to ask how the blind man figures to himself the position of objects, how he projects them into space. As long as they are not beyond the tactile range, that is to say within arm's reach, there is no difficulty, but the imagination and the thought of the blind are not enclosed within so narrow a prison.

A first proceeding for him is to lengthen his tactile organs by means of adjuncts. We have seen him make use of these for procuring very rudimentary notions as to the form and nature of objects. The indirect touch obtained in this way indicates their position more surely. This explains the use that certain blind men make of their canes, when walking, and their care to always have it with them. For those who have not contracted the cane habit, it is often, nevertheless, invaluable to them for exploring ground.

Infinitely more instructive still are the movements a blind man makes with his legs for reaching an object. The number of steps that he takes tells him how far it is away, and the direction of these steps tells him where he stands on reaching the object. With the distance and the direction, he has the two

necessary indications which will suffice for placing the object in relation to himself.

It is easy, certainly, to get a precise idea of the space represented by a step. By touching a wall, for instance, while walking, the blind man gets the transposition into brachial extent. But the translation of a rather prolonged series of steps into concrete space is not an operation as simple as one might suppose. It is generally done with extreme vagueness. We can prove this by trying for ourselves how difficult the inverse operation is, the translation into steps of a well known space. Ask a blind man how he manages to go from one spot to another, even in a well known place, when there is no landmark for guiding him, no noise or sensation of obstacles and no undulating ground. He will answer that, even if he has a clear idea of the distance he has to go, it is very difficult, if not almost impossible, not to stop either before, or beyond the place he is aiming at. Some blind men, but not many, count purely and simply on their muscular memory for this. In those cases it is consciousness of their movements which serves as a guide, and not a spatial representation. Others tell us that they would have to count their steps. Nearly all will acknowledge that they have no other way if some object, perceived by one of their senses, does not warn them the moment they arrive.

The sense of direction is still more vague. Hocheisen, on studying the articulations of the hand only, thought it proved that if the blind perceive slight movements better than those who have their eyesight, on the other hand they are less able to tell the direction of these movements. He explained this phenomenon by saying that the constant control exercised by sight on the limbs accustoms the

man who sees to a more exact consciousness of the relations between the muscular contractions and the orientation of movements. At all events, the difficulty that the blind man has in walking in a straight line shows that his perceptions on this point are very confused.

Supposing that the blind man has located an object at some distance away from himself, it is more often than not that it would be almost impossible for him to find it. The least movement causes him to lose the sentiment of the position occupied by the object. The very least rotatory movement produces, at a distance of several yards, a considerable swerve.

It will easily be seen that, under these conditions, rather extensive spatial representations would be developed with great difficulty. The blind man's effort, therefore, is not directed greatly in that sense. He usually endeavours to know the positions of objects in relation to each other, and above all in relation to fixed points. The task for his intelligence, and for his imagination, is to construct systems of representations in which special objects are classed and organised, and in which each of them serves as a support for the others.

In his study, for instance, the blind man situates his desk not in connection with himself, as he is a moveable point, but in connection with the four walls, with the fire-place, the carpet, the book-case and all the stationary pieces of furniture. In this image of the whole, he places more or less elements, according to his more or less active imagination. He prefers placing such or such elements in the image, according to the everyday needs which these or those objects suggest. As the ceiling is not of much importance to him, unless it should happen

to be exceptionnally high or low and should, therefore, modify noticeably the air and thereby affect his respiratory organs, it is frequently neglected. The width and length of a room are represented with precision, but the height is often left vague. The blind man will, however, be reminded of the ceiling, if the shelves of his book-case oblige him to measure the height of it muscularly, by frequent mounting for books. And all these elements of his representation hold together, consolidated by each other, and are evoked thus in his consciousness. In this way, it is enough for the blind man to know the position of one or other of the objects, in relation to his own body, the position of the carpet that his foot gives him, for instance, or the position of the table which is within reach of his hand, for him to be able to represent to himself the position of no matter which of the other objects. The stereognostic faculty, as we have said, permits, by means of one of its parts, the tactile representation as a whole, to spring up in the imagination. And so the whole room from henceforth constitutes, as it were, a single object.

The blind man is thus led, by practical needs, to constitute for himself images of the places where he lives quite equivalent to those of the man who sees. The image has every chance of being still more complete and still more stable, as the place considered becomes more familiar to him. But even for places where he only happens to be staying temporarily, he will try to make for himself an embryo image, by means of two or three landmarks. When he is in quite a strange place, only the number and direction of his footsteps can tell him the position of a certain object, and the knowledge he will have of it will be fugitive and not of much service.

7

The necessity of moving about stimulates powerfully the construction of these complex images. But a no less valuable stimulant comes to the blind man from his auditive sensations. I will not venture to affirm that this is necessary for the development of representations, for it seems to me that certain individuals born deaf and blind attain to a high degree of spatial imagination. Undoubtedly though, the auditive sensations are very helpful, and the blind who hear owe a great part of their representation faculty to the sense of hearing. Without this, the field of their images would be much more limited and, at any rate, they would be much less masters of them.

It has been claimed that the sensations of hearing are naturally extensive like those of sight and of touch, and that they are immediately perceived as localised in space. Psychological experience, no less than the physiological examination of the ear, seems to prove the contrary. A subject who has only auditive perceptions would know nothing of space, and the hundreds of variations of one single sound, which serve us for localising the sound, would appear to him not as consequences of the different positions occupied by its source, but as differences of intensity and of nature.

But auditive sensations have the property of associating closely with visual and tactile sensations. They evoke them in the consciousness, and they are thus bound up closely with the representation of the object which causes them. A barking makes the image of a dog spring up. They evoke, at the same time, and quite naturally, the representation of the position occupied by this object in space.

And as, according to its place, in front, at the back or at the side, according to whether it is more or less far away from us in height or depth, the sound is perceived by the ear with special modalities. Gradually, with experience, these special modalities become representative of the different positions of space. Sonorous bodies finally become localised simply when heard.

It is then tactile space again that the auditive sensations present to the blind man, the tactile space, that they have in a way incorporated with themselves, and if he had not first this tactile space, he would get no fruit from them for his spatial representations. But they have this great advantage over tactile representations, that they extend over a domain considerably vaster than that of touch. They thus take the place of tactile sensations in many cases. They represent distant positions, without requiring delay or movement.

Taught by touch, hearing usurps its prerogatives. The sound of a fountain spares me the fifteen steps that I must have taken in order to learn that it was ten yards in front of me.

Not only does it spare me time and effort, but the information it gives me is more exact. The difficulties of which we spoke a little while ago, concerning direction, no longer exist. The blind man is no longer obliged to follow a straight line, in order to find out the exact place occupied by the object.

He perceives the place according to the angle of incidence of the sonorous waves on his ear. He no longer needs to combine a number of movements for a representation of the whole. Finally, the noise being, as it were, constant, as a flowing fountain is, the representation persists in forcing itself on the consciousness. There is no risk of its being

turned aside, or of its vanishing at the least movement made by the blind man.

So much then for simple representations. For complex representations, in which various images are organised into a system, all of them depending on one another, the rôle of the auditive sensations is still more valuable. If the noise is continuous, or even if it can be repeated at will, it constitutes a starting point for all the other images, a landmark around which all the others group themselves. It supplies the foundation stone of the global representation, and the utility of it can readily be imagined. It is even more remarkable in a shut-up place, in a room, for instance. Secondary sonorities are there added to the chief noise, and these are instructive as regards the position of various objects. It is reflected on the walls and gives to the ears a confused image which has its value, and which is immediately translated into spatial representation. I have already said that the noise of footsteps on the floor, or the crackling of the fire give to the blind man the dimensions of the room. Thus he has, thanks to his ear, a representation of the same kind as that which the eye can give, a very summary setting which is often limited to a representation of the four walls, but a setting, at any rate, in which he can classify his images of detail. When he has filled this in, in his own way, sound may then evoke the contents at the same time as the container, and all the more so as the contents also, sometimes, have a certain action on the modalities of sound. Who has not noticed the muffled shades that curtains and draperies give to the sound of voices. It will cause all the various parts to be present at the same moment in the blind man's consciousness and, in this way, will help the work of the imagination. All this

helps to lessen considerably that great obstacle for the blind man: the absence of all global representation, so difficult to obtain by touch when it is a question of representations so far beyond his means of investigation.

This synthetic value of the auditive sensation bestows upon him all it has to give. In the place of a succession of tactile impressions, it gives him a simultaneous impression and supplies the consciousness, more or less thoroughly, with that element of co-ordination which, for a long time, it was believed could only be obtained from sight. It is, perhaps, thanks to the hearing alone that the blind man succeeds in getting a concrete representation, really intense, of vast expanses.

The sound of a gun fired three hundred yards away, a clear voice which, sometimes a hundred or two hundred yards away, impregnates a light, pure atmosphere, will suddenly send the horizon enormously farther back and fill it with a bright light.

A thunder-clap in the distance, which reverberates all round, has a still greater power of evocation. A stone dropped above a precipice which, after a second's course, sends backs its muffled cry, opens an abyss in the blind man's imagination and gives him, sometimes, a kind of dizziness. How many other auditive sensations, spur on, in a most forcible way his representation faculty! Their rôle in the affective and æsthetic life is most important. Not the least, perhaps, is the rôle of those familiar noises which invite the blind man to come out of himself and to let his imagination wander. Undoubtedly the obstacle sensations, participating with space, have similar properties of evocation, but they are much less exact and, above all, as they do not carry so far, the services they render for the extension of spatial

representations cannot be compared to the advantages of auditive sensations.

## 8

At all the different stages, the same difficulty always meets us, the difficulty of synthetising the notions of touch. Helped by the hand, the arm, the whole body, especially by the ear, it is nevertheless by means of his intellect, chiefly, that the blind man must count on triumphing over this difficulty.

Even for vision itself, the intellect appears to play an important rôle for ensuring its synthetic value to representation. We shall sec this more clearly if we observe certain patients whose retina is no longer sensitive, except in one spot of very small extent. In order to get an idea of objects, such patients are obliged to follow the outlines from their single point of vision and to build up their representation by interpreting the movements of their head, just in the same way as a blind man builds up his tactile representations by following the edges of objects with his fingers, and by interpreting the movements of his hand. At this degree, sight is almost like touch, and they resemble each other still more from the fact that sight then only perceives objects, usually, at very short distances.

As the organ improves, and the visual radius gets longer and the field of vision extends in every direction, the working of the mind, with a view to synthetise the notions furnished by the eye, becomes less and less complicated. All the various degrees of short-sightedness lead, by imperceptible progress, to perfect vision. But even with perfect vision, it seems that all the elements of the representation do not present themselves to the mind on the same

perspective. In every retina there are spots more sensitive than others, spots where the nervous fibres are more rich, and where the light is more intense. The rôle of attention is to look round on the surface of the object in such a way as to make the various parts come into relation with the senstitive spots and to bring them into evidence. The memory must retain these successive impressions, in order to give to the synthetic image a distinctness, a richness, an intensity that it did not have at first. The envelope that the eye throws over the object, and with which it wraps it round, facilitates the action of the mind, but it does not do away with it.

This explains, perhaps, a question which we have already discussed, namely that there is no difference of nature between the visual, spatial representation and the tactile, spatial representation. In this way, sight appears as an improved touch and touch as embryonic sight. Between two persons who see, one of whom is a bad visualiser and the other a good one, there may be quite as much, if not a greater distance, as regards spatial representations, than between a blind man and one who sees.

But, if pathology shows us a certain identity between the representations of the eye and those of the hand, the distance is no less great between the way in which, under normal conditions, they are both acquired. The improvement of the physiological organism takes place to the advantage of the intellect, which is relieved in a great measure from its task. If the reader has followed me, he will have seen that the blind man must supply a mental effort which the man who sees is spared almost entirely by the eye. The blind man must call several organs to his aid, where one only would

suffice for the man who sees. It will be understood that, in consequence, much greater individual differences will exist between the representations of the blind than between the representations of those who see.

Even in the most advantageous conditions under which the sense of touch may be practised, different degrees of skill can be observed amongst the blind. It is in the limits of what we have called manual space that touch is more like sight, as within these limits the blind man has a relatively exact synthetic perception. And yet, in order to pass from this first perception to distinct acquaintance with the object, from passive touch to active exploration, there must evidently be movements much less spontaneous and much more complex than for passing from passive to active sight, from perception by the eye at rest, to exact examination by the most sensitive spots of the retina.

Then, too, we must remember that the ear does not render the same services to everyone as regards spatial representations. A sound has more or less chance of evoking an exact spatial representation, according to whether the interest of the subject is more or less held by the forms of the objects. There are blind men who are specially muscial, and their attention is attracted by sounds as sounds. Life is for them a sonorous spectacle. Whatever may have been said, at times, on this subject, I do not think that, even for them, noises are not accompanied by any representations of space. It is evident, though, that elements of this kind, associated with sounds are much less calculated to impress their consciousness than that of certain other blind persons. Let us take, for instance, manual workers, who are always busy exploring with their hands and who are not

very sensitive to the muscial properties of bodies. Such individuals turn their attention to the practical utilisation of objects and, consequently, to their spatial qualities. For the former the exterior world has a tendency to translate itself to them in sounds and to the latter in forms.

The variations are still greater when it is a question of very extensive representations, the synthesis of which can only be effected by an effort of the intellect. Many content themselves with rudimentary representations, either vague or wrong; and in simplification, in vagueness, in wrongness, there are considerable varieties.

In order to remedy these imperfections of the blind man's representations, he ought to be taught, by practice, how to utilise, the best way possible, the tools with which he builds up these representations. Unlike the eye, the hand, the ear and the intellect often need a methodical education.

## 9

I cannot attempt to go into an examination of special scientific teaching for the blind. Its underlying principles can easily be deduced from the preceding pages. In the choice of exercises, we must not forget that, whilst cultivating the child's skill, the education of the senses cultivates his imagination at the same time. The two things go together. Movements intended for developing the agility of the fingers prepare the hand for scrutinising more exactly the objects with which representations are to be built up and, inversely, the simplest movements made for examining objects, as they are subordinated to a purpose, render the

fingers more skilful. A certain little blind boy, of six or seven years old, whom I knew and who handled the plane, the hammer and the saw, with his young companions who had their eyesight, for making dolls' chairs, arm-chairs, tables and wardrobes, learnt, without knowing it, to be a better judge of the proportions of things.

Games for building, drawing and modelling, which are so general in German schools, are excellent for teaching the child to synthetise images.

If the blind are not prepared by this special education, there are two great dangers which threaten them, on account of all the obstacles which their spatial imagination meets with on its way. These two dangers are: the invasion of wrong representations and laziness in constructing spatial images.

The blind man is constantly called upon, on account of his surroundings, to build up fresh representations, and to construct them with very great speed, so that his means of investigation do not suffice for the task. The language he speaks is a language made by those who see for those who see. Names are given to hundreds of objects that are outside his daily use and needs; names are given to other objects about which he can never get an exact idea. This language compels him to think of all these fresh things. It is in this way a perpetual incitement for his intelligence and his imagination, as the latter is always at work trying, as it were, to go beyond itself. The utility of such a stimulant is manifest.

It also has its dangers though. Sometimes the blind man contents himself with repeating the words he hears, but these words do not correspond with any precise image within the limited field of his experience. If he should let himself go in this way, and get

accustomed to this parrot-like use of words, his indolence in imagining may become incurable.

The mind rarely consents to this passiveness though. In order to re-establish the equilibrium between his too limited experience and his too rich language, the blind man has recourse to representation substitutes. He embroiders, as it were, on what he knows, he endeavours to manufacture, for each term, a concrete form, more or less rudimentary. He is too indolent, and too hurried, every time he hears a fresh word, to be able to give himself up to the minute investigation necessary for obtaining an exact representation. He, therefore, attaches to the word an inadequate image and, instead of clothing it with its own garment, he lends it a fantastic one.

The substance of this is sometimes supplied by the auditive properties of the word, still more often by the association of ideas which it brings with it, or by the qualities of such and such of its parts as have come under the senses of the blind man, or which he thinks have a connection with objects he knows. A mowing-machine, for instance, as long as the blind man has not explored it with his hands, or had it described to him, may be represented by a huge scythe attached to a vehicle of some kind, the form of which depends upon the individual imagination. The lack of order in his mind and his impatience are such that even the names of colours very often do not remain mere words for the blind man.

Even those who see are subject to wild representations of this kind and, with more or less indiscretion, their imagination works more quickly than their senses. With the blind man, though, who is deprived of much the most agile and comprehensive of all the senses, the harm of this may attain exceptional proportions.

A careful inventory of the blind person's vocabulary should be taken. One of the functions of education should be to control and purify the words that the blind misuse. True representations should be substituted for wrong ones, and words that are void of meaning to them should be explained. The means to this end would be to let the blind person touch as many objects as possible, to besiege his brain with exact representations. In that way, education would wrestle with the laziness of the spatial imagination.

Those who have this defect very rarely explore any objects with their hands, and when they do, it is in a very summary way and without any method. They enjoy sounds more than they utilise them. Their imagination is too flabby to put together the different pieces for representations which are supplied to them by their senses.

The result is that they remain strangers, as it were, in the surroundings in which they live. Not feeling the real presence of these surroundings, and knowing them so little, they are not very capable of moving about. A new table is brought into a blind man's room. He does not take the trouble to examine its dimensions. He only remembers the rugged surface of the wood-carving which his hand had first touched. Two minutes later, he stoops down to pick up an object. His head knocks against a projection which his imagination had not presented to him.

« For the blind man », said a manual worker who had thought about the conditions of his activity, » the difficulty of a trade lies much less in the apprenticeship and the practice of special expertness of the hand, than in the necessity for judging rapidly, with the fingers, the various details which are taken in quite naturally by the eye. »

How can the movements of the blind man be free and easy, if he has no clear idea about the room in which he moves about, or the furniture it contains? The more he advances from the fixed and relatively simple forms of activity necessary for most trades, to the free, complex forms which require, not a mechanism always the same, but a continual adaptation to surroundings that change, the more will the blind man feel the necessity for numerous and complex representations of place, such as those of rooms, gardens, houses, streets, plans of towns etc. His freedom of action will be in proportion to the rapidity and exactness with which he can construct his representations. No faculty contributes more towards ensuring for him independence and towards making of him a social value.

# FOURTH PART

# INDICATIONS ABOUT THE AFFECTIVE LIFE

## Chapter XIII

## PERSONS AND THINGS

### I

Visual images perform, in the psychial life, numerous functions of which the spatial representations we have just examined would be incapable. They are living, moving forces. They dictate deeds. They inspire sentiments. They are precious sources of sympathy. The sight of an apple awakes the appetite and the wish to have it. To imagine is always to will in a certain degree. What dreams of happiness the imagination can weave, when stirred by a beautiful face! How much benevolent compassion is aroused within us by the vision of infirmities and of physical ruin. It has been said, and not without foundation, that the extent and the force of our sympathy are in accordance with the extent and clearness of our representations.

For stirring souls in this way, the spatial representations of the blind, so meagre and so clumsy, are notoriously inefficacious. Animated representations are necessary for this, representations that

are bulky with sensorial impressions. Here the substitutes of visual images will be tactile images still impregnated by their sensitive qualities, but still more olfactory and auditive images.

Nothing prevents substitutes being given for them. We must take special notice of this fact. Sight does not act here by its specific virtue. It is not the determinative agent, but merely the incidental cause. It simply suscitates organic, motory and affective images, which are the direct sources of desires, movements and emotions. It would suffice that other images, coming from other senses than that of sight, should join with these organic, motory and affective images, and have the force to set these in motion for it to be through them that the necessary excitations should come from the outer world.

Why should touching the apple, the smooth, cool skin of which gives such a peculiar impression to the hand, not make the mouth water just as it would on seeing it? Why should not the cries of despair of a poor unfortunate not move my very soul quite as much as the sight of his grimaces and contortions? As a matter of fact, no one doubts that such is the case. The coldness of a corpse gives us a pang at the heart quite as much as the lividness of its face would. « The images of the differents senses, » someone has said, « are so many different dialects from which we can choose the most suitable to us for translating our emotions. » We know that for those who see, visual images are not necessarily the only ones. There are imaginative people of every kind: every order of sensations has its own special ones. One form of sensorial imagination is closed to the blind; but there are others remaining which can make up for that one.

But the same illusion is always there, namely,

as visual images occupy, almost entirely, the field of consciousness, as they are of exceptional clearness and richness, even in minds only moderately imaginative, it seems to us that they constitute an active power that nothing could replace. The man who sees can scarcely conceive that the blind man may have enough sensitive images to take the place of the visual ones, and above all that he can associate them with sufficient elements of consciousness.

We see that, thanks to social life, visual images, although they do not come under the blind man's senses, are not, from the affective point of view, absolutely lost for him, as, by means of the words which designate them, something of their emotion may be transmitted to the man who will never actually know them. It is, of course, very evident that he must not expect a great amount of psychical energy from them : he will only find in them what he has put into them himself. The psychical energy can only come from the sensations that take the place of the visual sensations. Some facts, by showing us the mechanism of this substitution, will make us feel that, in spite of blindness, the living images of persons, of things, of Nature, and of masterpieces of art, all those magicians which reveal to man his own riches, may easily cause to spring from our hearts, as from the rock of Horeb, the living wells of emotion and of sympathy which Nature has hidden within each of us.

2

In order to affect us, our images, in most cases, have to be strongly individualised. If every lion is likely to alarm us, as a lion, such and such a lion,

that we admire for his beauty only, affects us by what distinguishes him from other lions. The presence of a friend is agreeable to us according to what we feel in him, not of the man in general, but of the qualities which differentiate him from ohert men. It is evident that the spatial images of the blind can only very rarely individualise objects; and more rarely still persons. Very few plates are distinguishable by a characteristic shape from other plates. I do not mean from all the other plates in the world, but from all those which come within the boundary line of our experience. As regards persons, the diversity is undoubtedly greater, but that is a question of details of which the blind man is little aware, because he does not touch them. Even if he should touch them, many of the details would escape him, on account of their delicacy, and the analysis of a face by the hand would certainly be a very rudimentary analysis. Even the person who has his eyesight and only sees the figure and the size of the face, and is not able to see all the elements of individuation supplied by complexion and expression, would only have a relatively reduced faculty of recognition. He would only have the least significant elements.

Form, the characteristic of the finality of objects, and consequently very apt for determining generic images, is very inapt for supplying individual ones, from the vague aspects which appear to the touch.

Novelists who bring a blind man on to their scene do not fail to inspire him with an ardent desire to know the features of his mother, or of the woman he loves. The moment always comes when, thanks to the complicity of events, they allow him to pass his feverish fingers over the adored face.

The scene is touching and effective, but how very

unreal it is too! When it is a question of a man who used to see, and who is still penetrated with visual memories, this longing may be poignant. For a blind man, really blind, such a scene is only a literary ornament. The author breathes into his fictitious personage his own sentiments. He does not make him live his own life. The truth is that the physiognomy interests the blind man very little. He is not accustomed to finding there the expression of personality. It is a world which remains closed to him. His curiosity has not been turned in that direction, and when he only listens to his own sentiments, when he does not come out of himself and does not trouble about public opinion, beauty of face is the last quality he would care about in anyone.

What interests him more than anything is the voice. The human voice is an instrument of marvellous richness and flexibility. Thanks to its infinite shades of height, intensity, quality and tonality, and its varied inflexions, it affords the ear an exhaustless number of auditive combinations.
There is just as much diversity in voices as in faces, and no two voices are identical, any more than two faces are exactly alike. Wonderful as this most certainly is, it is no more surprising in the one case than in the other. The blind man whose ear is well practised can distinguish a considerable number of persons by their voice. Those who see are surprised at this. They *could* do the same thing, though, themselves Every day the telephone proves that they recognise unmistakably many more voices than they think they do. As long as they see the person to whom they talk, they do not realise that it is sufficient to hear him in order to distinguish his voice. It is another example of sight concealing

from them one of their faculties and, above all, preventing them from cultivating it.

I do not say that recognition by the ear is as sure as recognition by the eye. Far from it. Not only do voices, in the midst of a noise, become as unrecognisable as do faces in the dark, but many a « good-morning », uttered with a common-place intonation by two sisters or brothers, or, more generally, by two persons who live together and get into the habit of using each other's inflexions, will sometimes cause strange perplexity. There is nothing so deceptive for the blind as these brief salutations, as the sense of hearing, taken by surprise, has not time to pull itself together, as it were. But, from a practical point of view, auditive images certainly render inestimable services.

If they should fail us, the psychology of the deaf-blind shows us that the mind, reduced to less rich information, would still not be deprived of all resources. We have seen that Monsieur Guégan recognises those he knows by the vibrations of their footsteps on the ground. Monsieur Malossi seems to attach, more especially, a great importance to the representations of the hand. It is when the hand of a new arrival is placed on his that he calls him by name. Monsieur Malossi also converses with those around him by means of a manual alphabet, those who are with him touching his fingers, each one in his own way, the one heavily, the other quickly, another with some characteristic gesture. He has, in this way, as a means of information, these tactile voices which confirm his first impression. It is only in very rare cases that he makes a mistake. Mademoiselle Marie Heurtin distinguishes people by odour. For her, as for Helen Keller, each person has a special perfume.

3

All these signs do not entirely escape the blind man who hears, but he only notices them in a secondary way, for the same reason that the man who sees only notices the voice in an accessory way. Voices are useful to him sometimes for distinguishing persons. Characteristic perfumes, and the sound of footsteps on the ground, are specially useful to him for letting him know of the presence of persons who are silent. Without having as keen a sense of smell as Mademoiselle Heurtin has, one notices the special smell of certain tobacco, of toilet water, and of certain soap. One does not need to have a very well practised ear in order to distinguish between the solemn, heavy tread of a seventy-year old Senator and the light trot of a little girl of five. Between these two opposite examples of the footstep, there is an infinite number, each one of which has an individual characteristic. But it is more particularly for evoking affective images that these secondary indications are retained.

For, and this is the essential point, all these sensitive impressions that the blind man gets from the persons near him are emotive in a high degree. They bear the mark of the personality from which they come. They are laden with this personality, and they communicate it to the individual who receives them.

Let us rather say, in order to speak with more precision, that they are susceptible of associating themselves, in the consciousness of the blind man, with a considerable number of emotions, impressions and images, and of rousing a whole crowd of these. There are hand-shakes that are warm just

as there are icy ones; there are cordial ones just as there are flabby, lifeless, vibrating, indifferent, feverish or calm ones. There are those which *affect* kindliness and there are those also which are sincere, The blind man attaches to all these differences and to many others, the various shades which words can only express in a very imperfect way, all the value that the man who sees would attach to those expressions of the eye which have for him such varied affective significations. But above all the whole soul is reflected in the indescribable shades of the voice. There are voices which penetrate to the very depths of one's being. I know voices which have caused sudden passions just as faces do. Voices have their intrinsic beauty, their musical beauty, and I might almost say an objective beauty. They are also impregnated with all the moral beauty that we have proved in their owners, with all their delicacies of soul, with all their deeds even, and they bring to us these perfumes blended together in an indescribable unity.

« When a person holds out his hand to me, » says a blind man, in a letter to Monsieur Heller, « I know at once what feelings that person has towards me. A vigorous grasp, not too suddenly interrupted, means kindliness; a rapid touch, pride and a feeling of superiority. The characteristics of the physical person are manifested to me by the structure of the hand : a soft hand, without much muscle, gives me the impression of a feeble individual, and the remarkable thing is that this impression often agrees with the indications I get from the sound of the voice. As to the nature of the person's occupations, I discover that from the state of the skin : a working-man can be distinguished certainly from an intellectual. It is often possible for me to

guess more exactly the trade of a person. I recognised a tailor at once from his fingers all worn with sewing. Other landmarks are supplied by rings worn on the fingers, and the care with which the hands are kept : I knew a blind man who surprised a group of persons whom he had just met for the first time, by giving, from the contact of their hands, exact information concerning their sex, age, condition and inclinations. »

« One of my friends, » Helen Keller tells us, « has tenacious, self-willed hands, which denote great obstinacy..... The contact of certain hands hurts. I have met people so absolutely joyless that, when I touched the icy ends of their fingers, it seemed to me like giving my hand to a North-eastern hurricane. There are others whose hands seem to hold sunbeams, so that their contact warms my heart. »

Odours have for her a signification just as rich.

« Sometimes, » she says, « it happens that I meet with people who have no distinctive, individual odour : I rarely find them animated and agreeable. On the other hand, those persons whose odour is very marked often have a great deal of life, energy and intelligence. The exhalations of men are generally stronger and more individual than those of women. In the perfume of young people, there is a something elementary, something that is akin to fire, hurricane and the tide of the sea. One smells in it the pulsations of force and of the desire of life. I should like to know whether others have observed, as I have, that all little children have the same perfume, a pure, simple perfume, indescribable like their personality which has not yet awakened. It is not until the age of six or seven that they begin to have a perceptibly individual perfume.

This develops and ripens with their physical and intellectual forces. »

With Helen Keller, the tactile and olfactory qualities of persons have a faculty of evocation so great that she does not remember them : she forgets whether the hand was soft or rough and only remembers the moral qualities which she inferred from the touch; or, let us say, that she thought she recognised in the persons. Passing from the sign to the quality signified, it is amusing to note how logical inductions, and the most fantastical inferences, are mixed up with each other, the former taking the place of the latter and frequently not being distinguishable in the idea of our observers. But with the voice, the wealth of expression of which is infinitely greater, the interpretations are much more daring still.

Certain blind persons are fond of saying that they are able to judge the moral and physical qualities of an individual from his or her voice. Monsieur Romagnoli, for instance, goes as far as asserting that he can distinguish the colour of the hair and eyes from the voice of a person. And he justifies himself by reminding us that all the qualities of the same subject are bound up together by fixed and determined relations. This is truly a strange illusion. At most, one can say that the voice furnishes fairly exact indications with regard to age. Voices age like faces; they fade, lose their freshness and get wrinkled, as it were. We can also say that they give indications, less exact, but not to be despised, as to the height and size of the persons. For all the rest, there is very little upon which to count. But this illusion is strangely full of meaning.

It shows the work of creation to which the consciousness will give itself up on hearing an expressive

voice. It shows, too, the incapacity of the consciousness to take for what it really is, as an objective notion, all the imaginative crystallisation with which it has clothed this. The World of the Blind should have its Lavaters and phonognomy take the place there of physiognomy.

The testimony of a few blind persons will not be out of place here.

« For the last few years », writes a blind lady, « since Monsieur G..., has been living in this locality, everyone sings his praises. People are glad to exchange visits with him, his wit is praised, his wisdom quoted, his piety admired; he is, in short, perfect. Well, with all this, to whom could I own that I do not like this man, that he is uncongenial to me? Every time I meet him, I listen to him and I analyse him, but I always have the same feeling. I am persuaded that some day facts will justify my impressions, for, so far, these have never deceived me. And yet, I do not think I am endowed with any special perspicacity. I think, though, that in such matters we can see more clearly than those who have their eyesight, for what we perceive speaks more clearly and more faithfully than what they are looking at. It is very rare for me to ask about the features, or the expression, of such and such a person. If I have heard that person, the image that my ear engraves for me cannot be modified by the testimony of anyone. But, to return to this Monsieur G....., I had not met him for thirteen months, when, one day, at the house of Monsieur P....., he was announced. I heard him come into the room. His walk, which is too slow, too measured, reminded me of Sir Walter Scott's description of Olivier le Daim entering the judgment hall. Monsieur G..... shook hands with me. What was it that I disliked so

much in his hand-shake? I cannot tell, but I should recognise it among that of a thousand people. He assured me that he was very glad to see me again. I did not believe it, and was glad when a seat was offered him at some little distance away. Conversation began again and he soon took the lead in it. His rather feminine voice, of muscial quality, was gracefully modulated and lent an insinuating charm to his ready flow of words. But in this gentle voice, I could hear that hidden note, that indefinable vibration, that special accent, that something repellent which told me, more peremptorily than any reasoning, that the heart and the lips were not in unison. It seemed as though the laugh were distrustful of itself, it rang false. Presently, the question of religion was discussed. Oh, on that theme, Monsieur G.... was most edifying. What fine phrases rolled from his lips! And yet, all he said roused my impatience. I almost wanted to contradict all these holy things he was saying. His tone, the more I listened to it, seemed more and more out of harmony with truth. »

The bold dogmatism of our impetuous physiognomist is very significative in this case. It shows with what force these impressions, given by the voice, will sometimes make themselves felt. The faith of the phonognomist in his art is sometimes expressed with the most amusing serenity.

« A person, » says a blind man, « may disguise the expression of his or her face, in order to deceive others. It is impossible to disguise the expression of the voice, as that informs us, with certainty, about the qualities of the soul. It is not the face which is the mirror of the soul, it is the voice, or rather those characteristics of the voice which one cannot describe with precision, but which speak directly to the heart ".

A blind girl, of whom Monsieur Hitschmann tells us, fell in love with an actress, through the charm of her voice. When told of certain exploits of her idol, she exclaimed, in a naïve burst of despair: « If such a voice is capable of lying, what are we to believe in? »

In the case of Monsieur G.. ., a more or less conscious intellectual appreciation seems certainly to have preceded the physical antipathy, and the accents of the voice, the bursts of laughter, the handshake were only odious, because they were coloured with these intellectual impressions not clearly defined. In the last example we give, it is not the same. There the physical impressions alone seem to have been at work. The psychological mechanism is the same, though. Sensations are only the conjuncture of associations of moral impressions, more or less distinct, which are the factors of emotion. In any case, the following shows how sudden their action may be.

« When I was young, » an unmarried blind woman tells us, « I once heard a young man, at a concert, recite some comic scenes which were absolutely insignificant and to which I paid no attention, but I have never forgotten his voice. It went to my very heart and I had a great wish to know him, to speak to him. It was like an irresistibe attraction, and I was obliged to have recourse to all my will power in order not to have that voice always present in my thought. »

## 4

A letter will show us how close and profound may be the union of a blind woman and her husband, how various and powerful the mysterious bonds

which may cement that union. A blind wife writes thus of her husband :

« I love in him the sound of his voice. When he talks, even of indifferent or common-place things, I find an infinite charm in it all, and as soon as I hear him, my heart thrills and I am joyful. Besides the ring of freshness and youth, and a sort of vibrating force, there are exquisite inflexions in that voice in pronouncing certain words. He does not say my name like everyone else. From his lips, my name is dear to me, it has a delightful sound. I love his wide, open hand, which when pressing mine, denotes emotion, joy, inexpressible tenderness, enthusiasm and also vigour. When he lays his hand on my arm to talk to me, I feel enveloped in a strong and tender protection. I love his firm and resolute footstep. It is as though I felt in it what my own lacks. I like to feel the silkiness of his hair under my fingers. I like to hear his breathing. It is as though I felt, there too, something else good. Oh, I love him altogether. I see him from afar, with his quick step, the vivacity with which he opens and shuts the doors. I know his way of putting the key in the lock and I love all that. Are his features handsome? I know nothing of that. For me, all his soul is in his voice, all his heart is in the pressure of the hand which closes our dear conversations. (1)

## 5

« Just as people have an « auditive physiognomy » and a « tactile physiognomy », so for the blind, as well as for those who see, things have an aspect which individualises them strongly. They some-

(1). This and also the two preceding extracts are taken from *Les Sœurs aveugles de Saint Paul*, by Maurice dc la Sizeranne.

times have voices, contacts, perfumes which make them recognisable among a thousand, and which are capable of touching us to the very depth of our being. It is by all this that they communicate to us their soul, quite as much as by the images that they place in the eyes of those who have their sight. The knob of the door-bell, the handle of the door, the sound of the bolt being drawn inside, all these things tell me, before entering, that I have come back to my old home after ten years of absence. My footsteps resound in the hall. It is ten years since I heard that muffled sound. The smell of apples comes from the pantry to the right. Every room has its own special sonority, and I recognise them all. Mine alone, alas, has changed. It no longer has its curtains and its furniture. It is empty, and that gives it a hoarse, broken voice. Everywhere else the well known pieces of furniture are in their old places. The convent-bell just near begins to ring; it is just the same as of yore. The carriage driving along in the street is suddenly noiseless. It has reached the wooden pavement that I know so well. I go to my old writing-table and my hand lingers on the mahogany, so smooth and soft to the touch. I sit down on the deep leather-covered chair, and I listen to the doors opening and shutting, one after another, in the house. Each door has its own voice, and I recognise them all with sweet emotion. The kitchen door squeaks a little more than formerly. It has no doubt been neglected. I then hear the gay slam of the drawing-room door, followed by a timid echo in the wainscottings. I hear the step of my mother going up to water her plants. Has she done that, then, every day for ten years? The whole house becomes animated like this, whilst I bend my head as though to get impregnated with its

life. Every corner is a nest of memories which awake and palpitate with life.

How many and how varied are these fleeting impressions which attach the blind man to things, mysterious bonds which will not let him go away without a pang at his heart, and which cause him emotion when he returns! They belong to everyone, these impressions, but those who see often neglect them, as they notice and are moved by visual images only.

Listen now to a blind man who knows the blind, and who is an authority in all matters connected with them. I mean Monsieur Maurice de la Sizeranne. He knows that the blind man hangs his memories on to the corners of tables, on to the arms of the chairs that he has so often stroked with his hand, and that, trustworthy depositaries as they are, the things touched and heard, just as much as the things seen, give back to the imagination and the heart the treasures confided to them, and people them with past joys and sorrows.

« For the blind, » says Monsieur de la Sizeranne, « as for those who see, it is not a matter of no consequence to live one's life always in the same house, where old memories by agglomerating, co-ordinate and can be found again at any time, instead of being scattered here, there and everywhere, thanks to fleeting impressions, due to a more or less wandering life.

In a strange town, or house, the blind man feels out of his element as much on account of the absence of noises to which he is accustomed, as by fresh noises, or rather noises that he used not to hear where he formerly lived. One gets accustomed to the atmosphere of sounds which, in a way, live with us. This is, as it were, the auditive horizon.

The solitude of a place is not purely objective. The subjective part of this impression is very great, for one feels so much more alone and isolated because the things around, objects and sounds, are unknown. They do not remind one of anything, and everyday thoughts and preoccupations are not mixed up with them in any way. After a few days spent in these new surroundings, the preoccupations of life come back. One has left some of these elsewhere and one finds others here; but, during the first hours of the days when the sound of the church-bell, or of the clock, is unknown to us, when the footsteps we hear remind us of nothing, when the noise of doors does not tell us who is coming or going, the impression of solitude is very great. »

## Chapter XIV

# NATURE AND TRAVELLING

### I

The blind man, then, is not, as people are so inclined to imagine, walled up within himself, after the fashion of a silk-worm within its cocoon. He is, in every circumstance, in communication with the persons and things which surround him. If he should be present at one of those heartrending ceremonies, the burial of someone dear to him, for instance, he is not necessarily isolated in his great grief, and obliged to think out his sad thoughts alone. What is going on in the outer world may disturb and modify those thoughts. There are many signs which will bring to his mind the various rites of the religious ceremony, the sprinkling of the coffin with holy water, the image of the bier, which is present in his imagination just as it is in the imagination of those who see, but whose eyes, for the moment, are blinded with tears. At the cemetery, the atrocious clang of the chains, that clang which sends a shudder to the very marrow, and opens at one's feet a yawning grave, with its coffins of the members of the family still lower down, and then this coffin, so near that the blind man could almost touch it with his hand, goes down slowly, beyond recall, and will never come back. He is there, the

blind man, not only in thought, but in flesh and blood, with all his body, all his nerves and all their suffering fibres. Then too, there is all the music, the singing, the words spoken, the intonation, the kneeling, the standing, so many slight indications, scarcely noticed, perhaps, by the others, but which will help him, when he wishes, to weave the tissues of representations, by means of which all will become present to him again.

All that he needs for this are emotive images richly associated in the consciousness, and a great sensitiveness to impressions from outside. Now these are precisely the essential elements for the sentiment of Nature. There is no reason why the blind man should be deprived of this. If we despoil him of it, it is because we forget, only too often, that the eye is not alone for drinking greedily from the magic bowl. Nature envelops us entirely, it enters into us by all the pores at once, it comes in, in long streams, by all the open windows.

With the blind man, as with the man who can see, the sensorial contents of consciousness are quite different in the country from the town. Think of all the various street noises by which it is assailed: hurried footsteps, shouts, cries, rolling of carriages, the rhythmic sound of horses' hoofs, the nervous rattling along of motor-cars, the various horns, whistles etc. Then there are all the mingled odours wafted along from the various kitchens, bakers' shops, chemists' shops, factories, and perfumery of all kinds. There is the tactile scenery also, which escapes those who have their eyesight. There is the macadam of the footpath, so even under one's tread, which makes one's walk monotonous, as there is no change except for the ups and downs of hills. There are the gratings of the drains and

the worn ground under big door-ways. The atmosphere is not crisp, but neutral, as it were, and rather heavy, clinging round us wherever we go.

In the country, for the blind man, everything is changed. He has the direct sensation of open space, all round him on every side, blowing on to his face a fragrant, tonic air. The tufts of grass which make humps on the ground, of the most capricious shapes, cause him to vary his walk at every step. The smell of hay, mingled with the delicate perfumes of wild flowers, makes him catch his breath. In the midst of the relative silence, which for him is like light coming after dark, he goes over, one by one, like a true connoisseur, the moderated noises which reach him. He hears the songs of birds, the whistling of a blackbird, the bark of a dog in the distance, the bellowing of a cow a few yards away, and the confused murmur of the grasshoppers.

In both cases, they are quite different materials which fill his senses and weigh on his personality. In the country, how many different languages are understood by the senses. A walk on the road, where the foot treads on flat, hard, sonorous ground, and where the silence is constantly broken, differs essentially from a walk in the meadow. A village walk has again quite a different character, with its noises of fountains, the crowing of cocks rending the air, the barking of the dogs which comes from open doors, the muffled cooing from behind the houses, the dull echo, sent back from walls quite near, of footsteps on the beaten ground. On entering a farm-yard, there are the strong odours of the cow-house, the stable, the pig-sty, the sheep-fold, the dairy, the dung-heap where the hen is clucking after laying her egg. There is the odour, too, of

apples rotting, and one hears the wooden shoes of the farmer's wife on the bricks of the kitchen floor, and smells the cabbage soup. The forest says something quite different, with its deep, fascinating voice, its even coolness, its penetrating odours of resin, the crackling of its leaves under our feet and the noises of its dead branches which break with a dry snap.

The forest path, above all, is the blind man's friend, that path under the trees, where everything is so familiar and which ingratiates itself with a kind of haunting persistency, making use of the mosses, the pine cones, the dry twigs, the roots, the unevenesses of its soil, which diversify its tactile aspect all the time. Then too, its mysterious silence, during which the slightest noises speak to the soul, for silence is not a *néant*, and it sometimes fills the soul with a voluptuous reality. There are the scents of flowers, the shade of the leaves wrapping one round like a mantle soft to the skin. Then there are the branches which keep coming to touch one's hands and brush against one's face.

Boating is quite different on the sea, or on a river. On the sea, one has the voice of the waves, the ebb and the flow, the scent of the sea-weed, the salt on one's lips, the intoxicating breath of the breeze, and all this creates the sensorial atmosphere. On the river, there is the penetrating calmness, the quiet splash of the oars, whilst the boat glides along insensibly, the delicious silence, a silence quite different from that of the woods.

And the tactile scenery is ever changing. Everyone has felt, on his body, that the wind blows in many ways, from the breeze that caresses to the wind that lashes; and that the sun has many kinds of rays, from those that warm and vivify to those that sting, and burn, and kill.

I must apologise for insisting on these banalities. Every man who sees, knows these sensations. But, as a landscape individualises itself immediately for him under the form of a spatial representation, he does not feel the need of increasing these sensations by calling attention to them and of giving the synthesis of them. It is by their syntheses that, becoming representative of the different landscapes, they have a special value for the blind. These syntheses cannot be described in words, for the very analysis necessary for translating them into words would take away all their originality. I was compelled to remind my readers that the matter for all this is much more rich and varied than would, at first, be supposed. Here again the difference is in the utilisation of the sensations, and not in the sensations themselves.

Deluded by the ear, as those who see are by the eye, do not let us make any mistake with regard to the keenness of the other senses. We are surprised, sometimes, by the richness of synthetic perceptions that Helen Keller obtains from her surroundings. One day, for instance, during her childhood, she was alone and some distance from the house of her parents. She had perched herself up in a tree when, all at once, she had an impression that she was going to be caught in a storm.

« Quite suddenly », she writes, « a change took place in my tree. The air was at once cooler. I understood that a dark veil had come over the sky, as every sensation of warmth, which for us is the sign of light, had disappeared. A strange odour rose from the ground : I knew it well, for it was the odour which always precedes a storm. An inexpressible terror gave me a pang at my heart. An ill-omened calm then took place all around, and the branches

began to rustle. I came down as far as the fork of the tree. The branches were swaying about, all around me. I felt their shaking every minute. It seemed as though something heavy had fallen, and as though the shock had reached as far as the branch on which I was seated ".

2

The sensorial state of the blind man varies then greatly, according to the places where he goes, and his senses, even if not very keen, are capable of taking in, and getting rid of, the numerous impressions to be gathered in his immediate surroundings. The blind man feels then, every second, where he is, and that is certainly of incontestable practical interest. But, asks someone, what have these poor sensations, which are fleeting and without any hold on the soul, to do with the sentiment of Nature? In order to touch us, there must be the richness of pictures seen by the eye; there must also be that persistency of sensation which holds the soul, as it were, and makes it subservient to impressions from outside. We have only to close our eyes and the bonds which attach us to things slacken at once. We feel ourselves at once isolated.

To speak like this is to forget that the sentiment of Nature does not come from Nature. It has its source within ourselves. It is we ourselves who send it out to Nature. We give our soul to it, in order to be able to thank Nature, afterwards, for giving it us back. « Forest without woods, » cried Rousseau, « marshes without water, broom, reeds, sad heather, insensible, dead beings, this charm is not in you, it could not be, it is in my own heart which wants to

bring everything back to it. » And again he says: « The spectacle of Nature is in the heart of man: in order to see it, one must feel it. »

Thus, in order to arouse emotions within us, it is enough for the things to be able to reach the heart and, in some way, stir it by means of sensitive images. The organ which transmits the impression does not matter. It is the heart which receives it. The same landscapes of Normandy are contemplated by the heavy cattle, grazing in the meadows, and by the artists whose pictures move us. « The greater part of living beings, » said Guyau, « feel, on an average, in the same way. The chief difference between their sensations comes from the more or less great expansion of their intelligence which, in one case, only sees the rude object, and in another divines in that object a whole world. »

I do not, certainly, set forth that the blind man has treasures of sentiments unknown to the man who sees; but, with equal resources, he ought to get very much more out of his images. Eager for the emotions that sight gives to others, he asks for those same emotions from the impressions which remain to him. He pours out on them his whole soul and animates them with an unhoped for life. That they are capable of becoming impregnated thus with the overflow of our hearts, and of living the life of our imagination, poets who see keep telling us every day. It would be quite easy for me to give a number of pages, taken from their works, where they describe to us, almost without reference to sight, their emotion in the presence of Nature. We should find there the proof that the voices of Nature, its perfumes, its contacts, touch unawares those even who believe that they owe all their emotion to the spectacles displayed before their eyes. How much

place they take up in the poetry of a Lamartine, who could never look at a landscape without blurring it and remaking it, according to his own fancy, and whose lyre vibrates in all its strings at the same time, each one of them sensitive to the impressions from outside. In winds, in waves, he heard voices of all kinds, caressing voices and angry voices, threatening voices and voices of complaint and of distress, deep voices of manly strength, sighs of weakness, or cries of violence, songs of sirens and howling of monsters. Whilst listening to the mysterious harmonies of the Universe, he felt, better than anyone, what the poetry of Nature is to the blind man.

Thanks to so many different impressions which appeal to him at the same time, the blind man can not only retain distinct images of the various places he has visited, and attach to them something of his soul, but it also happens to him that he can remember various images of the same place, differing according to the circumstances under which he has constructed them and which may have various affective values. The auditive and olfactory aspect of the village is not the same in the middle of the afternoon, when the sun burns and the peasants are at work, as in the cool of the evening, when the cottages are all animated. The wind does not blow among the leaves in the same way in summer and in autumn. The perfumes from the flowers and from the fruits vary with the seasons.

The blind man only has one image of a table. He does not get, like the man who sees, one representation of the whole, another which is a side view, and another of the table in a certain light. Of places, he can have more diverse representations; and the more the image is individualised, the more

susceptible it is of having an affective value. The same landscape will speak differently to the heart, according to the time of day and to the seasons, which give it various colourings, as also according to the emotions which colour our own sensations.

The blind man is not then, as regards Nature, like the man who can see, but who closes his eyes for a time.

The procession of inner images, of memories, of emotions, of thoughts even which these bring in their train, varies with the processions of sensations which come to him from things.

He can get away from them and concentrate himself within himself, but he can also let himself go and drift at their will and pleasure. Nature, by other ways than eyesight, can pierce through to his heart and regulate its very beating.

Theophrastus said that, of our five senses, hearing is the one which inspires the soul with the most passions, and with the strongest passions, with agitating terror or rapture.

Montaigne observed that odours « changed him and acted on his spirits, in so imperious and captivating a manner » that he thought them capable of inclining us to religion, and that he recommended the use of them in medicine.

For the blind man, too, homesickness may be very painful. I know one man who experiences an almost childish joy in returning, each year, to a little corner of the world where he finds once more the impressions of his childhood, where, in a beloved wood, he can steep his soul once more in old memories.

For him, too, the memory of certain heartrending crises is associated strongly with the places which witnessed them, and which have become the depositaries of them. One returns to such places in search

of the echo of past emotions, sometimes because the noises of everyday life have stilled these within our poor, forgetful hearts. I know someone, who dreaded the idea of finding himself again in a place where he had lived during a fortnight of despair.

Another, at the age of twenty, was so fond of Lamartine's *Lake* that he recited it to himself every day for months. The music of the poetry was not the principal charm for him. That communion, which he felt there, of the suffering soul with Nature, the ardent prayer which the poet addresses to things to remember him, expressed, for him, sentiments which caused his heart to swell with emotion.

In certain periodicals intended for the blind, Nature is not absent. In « Le Louis Braille », there are articles entitled *Prelude of the Spring* and *Impressions of Autumn*. The author is blind and the impressions that he communicates are those of a blind man. The following are more characteristic titles :—*The Music of the Trees*; *The Song of the Birds*. These are written by a blind man who lives in the country, and whose home is surrounded by a large park. He has endeavoured to fix, by muscial notation, the songs which come from the trees and he gives his readers the results of his studies. He has just published, in a small volume, what thirty years of familiar life with the birds has taught him. I am giving the following extract from one of the articles mentioned above :

September 30, 1895.

" It was such tranquil weather, I could not leave until I had been and gathered a few bunches of grapes to eat on the spot. The grapes are so delicious this year. I chose the *Crêtes Hill* for my walk.

It is, I remember, one of my favourite spots. We went through the principal streets of the village with its houses, on either side, forming a more or less symmetrical line. Their walls sent out to our faces rays of warmth, which the sun had been lavishing on them for hours. Sunday is really a day of rest in the village. No carts, no sound of tools; here and there, at the doors of the houses, groups of men or women talking, arguing, but amiably and without any hurry, like people who had plenty of time. I was in a hurry, though, to get out of this warm, concentrated atmosphere. Finally we had passed the last of the houses, a freer and lighter air circulated, no obstacle stopped the fresh current which came down from the mountain like a memory of the pureness of the breezes up there. Our road lay through shady meadows and from time to time we passed by fruit trees. It is easy to distinguish the varieties by the special scents which escape from their branches. The odour of ripe fruits almost replaces that of flowers. The short grass, where the feet already trod on dead leaves, only gave out now a mild, somewhat vague odour. The autumn had certainly come, all was tempered and mild. We reached the vines, and the road became narrower and hilly. There was no more shade over our heads and the sun seemed to flood all space, but I did not attempt to protect myself from its rays. On the contrary, I felt a sort of well-being in letting the vivifying warmth, free from all impure emanation, penetrate me thoroughly. We skirted a wall festooned with brambles. We had reached our goal, as this was the summit of the hill. Our vine was below, but I did not care to go and clamber down to it. I left that for more skilful climbers, as I preferred sitting down at the edge of the path and enjoying, once

more, the delightful language which Nature addresses to those who care to listen. As a child, I used to love to look down from the top of this hill; in front of me the vines stretched out, in a winding slope, as far as the plain; over there were the fields where I used to see the corn waving; over yonder, the Rhone like a long, white trail. To the left, a chain of big, greyish rocks; to the right, meadows and irregular house-tops with smoke curling up from them. This picture has remained with me, but only my eyes were attentive then, for, in my memory of it, the scene has no voice. Oh, what a wonderful thing Nature is! If it becomes veiled for you, and its colours and gay perspectives hidden, then it reveals to you, and lavishes upon you, charms of which you knew nothing, charms that are, perhaps, still sweeter and more familiar still. And how varied its language is! Every different site, at each season, has its own special expression. What I heard in this place was not what I heard on the mountain. The warm air around stirred very gently. Only a few leaves fluttered under its breath. The insects, attracted, no doubt, by the sweetness of the ripe grapes, seemed to me to buzz less noisily; the voices of the people down below could be heard distinctly, but they were less loud; all the sounds that came up seemed to be softened; the landscape was very living, but it was solemn. What peace, what delightful tranquillity!

I wanted, before leaving, to tell you briefly of that beautiful walk yesterday. When once I am back at Villeurbanne, it seems to me that I could not speak of it, for the whistles of the factories, the rumbling of the trams, the harsh voices of the street-sellers are an unsuitable accompaniment for hearing, even in memory, the quiet voice of Nature ".

3

It is scarcely necessary to say that the sentiment of Nature which, even with those who see, is only developed in exceptional cases, does not fall to the lot of all the blind. It is, perhaps, in its highest forms, a conquest of the modern soul, as it is only a century and a half ago that men like Rousseau, and Bernardin de St. Pierre, taught us to cultivate it. I wanted to show that the blind man, too, may have his share of this sentiment. Of course, he will have a less beautiful share than the others, and more often than not it will be denied him altogether. There are chosen souls that are visited often by dreams. For such souls, a flowing stream, a dying leaf, everything, in fact, may be matter for emotion. Perhaps it is necessary to be of this fortunate, and yet suffering, élite, in order to be moved profoundly by impressions of Nature.

There are spectacles in Nature before which every man of a certain civilisation, no matter how slightly his sensibility has been cultivated, owns that he feels an impression of beauty. The immensity of perspectives, the variety of details blending in one harmonious whole are, perhaps, the essential elements, of this beauty in Nature which obliges the admiration of all.

But in this case it is no longer the individual soul, it is the soul common to all humanity, fashioned slowly during long centuries, which bears witness, in a marked manner, leaving its impress on the things for others to find in their turn.

Sight is, perhaps, the only sense which gives such elements. To the eye alone belong boundless horizons, endless plains, mountains rising one above

another until they are lost to sight, valleys descending in dizzy abysses. The spatial quality of his images has also, in some cases, an affective value for the blind man. He can, for instance, construct for himself the design of a garden that he knows and enjoy his own representation of it. At the seaside, his imagination may expand and weave, with his restricted spatial images, an indefinite vision which gives him the sensation of the infinite. An auditive impression, the sound of the wave coming from afar, will favorise, in a singular way, this work of construction which is always complex. But without the aid of an auditive impression, the spatial image would, more often than not, remain inefficacious, and when a sound animates it, it does not vivify each one of its details.

The highest forms of beauty in Nature, the most communicable, remain hopelessly closed to the blind man. He is limited to the more subjective forms. The impressions of which they are made have only the emotive value that he gives to them, and this depends chiefly on his own individual sensibility, often even on his state of mind at the moment. When he describes them, he usually only communicates very imperfectly the emotion that they caused him.

## 4

It is probably on this account that many people who have their eyesight are surprised to find that many of the blind have a decided taste for travelling. According to these people, all places must be alike to the blind and they would, therefore, do well to stay quietly at home, and so avoid all the complications of journeying about. They argue as though the sole object of their own travels had been to visit

magnificent sites. This is a strange illusion and the cause of the illusion is typical. They speak as though all the enjoyment of travelling were due to the sensations of sight, as though there were no other sensations. Then, too, thanks to a fresh simplification, among the sensations of sight, they only consider those which, thanks to their nature, cannot be replaced by any others, and, after this audacious abstraction, they come to the conclusion that it is absurd for the blind to wish to move about in the world.

One does not certainly travel merely for the sake of visiting picture-galleries, nor even for the sake of seeing beautiful landscapes.

I am not discussing now travelling for business matters. All who have read my preceding chapters will know that the blind are capable of taking part in ordinary activities of very many different forms, so that certain journeys are frequently necessary for them.

They will also readily understand that for certain objects which he may have in view, such as the visiting of some special establishment, or the study of some social organisation, a blind man will frequently get more information, thanks to the use he will make of his other senses, by going himself, than by listening to the reports of an ocular witness.

Let us now consider travelling for pleasure, and more particularly excursions in which the eyesight would appear to have the chief rôle. There are tourists who go every year to the Alps. Let us eliminate all the pleasures they get which are not obtained by sight alone. There is the enjoyment of activity, of energy used in excursions, of difficulties overcome in mountain climbing, of change of place. There is the break in the monotony of everyday life, the

change caused by making fresh acquaintances, and endless other varieties of entertainment. If all tourists were only to use their eyes, if all were to be excluded whose one object in travelling was to find beautiful scenery, there would certainly be more room in Swiss hotels than there generally is. Needless to say, all this is not written with the futile desire to under estimate the joy obtained by eyesight. The blind man may not know this joy, but he can only too well imagine how great it must be. My wish is merely to repeat that, great though the prestige may be of enjoyment obtained by sight, there are other enjoyments hidden behind, and frequently not appreciated, which have, nevertheless, a concrete reality.

There are blind men who delight in mountain-climbing. I have already spoken of Mr. Campbell, who reached the summit of Mount Blanc. It seems to me that his guides are to be admired even more than himself. Hollman, another Anglo-Saxon, who was an explorer, lost his eyesight during one of his first voyages, but continued, nevertheless, to roam round the world. He refused to be accompanied on his adventurous roamings, declaring that habit had given him « the faculty of getting as exact an idea of things by his own resources as he would have had by the most minute description. » These are exceptional cases : there may also be a certain vanity and a puerile desire to equal those who have their sight. But without any spirit of imitation, and without the slightest vanity, the blind man may perfectly well love the country, the sea, or even above all the mountain, and those who associate with him should not imagine that there is the slightest idea of imitation or snobbishness about his preferring to take his holidays in one place rather than in another.

The person who sees, and who returns every year to the same spot in the country, to a place more often than not, according to other peoples' opinion, void of all æsthetic interest, does not go there to revel in fresh and magnificent sights. I know he declares that if he no longer saw the scenery to which he is accustomed, nothing would induce him to return to that spot. But he also declares that if he were to lose his eyesight, he would have no wish to live, and nevertheless the blind man continues to live. As a matter of fact, if he leaves town at fixed dates, it is to break away from the routine of everyday life, to have a change, to go back to old memories which soothe his mind, to feel himself in an atmosphere of other occupations and ideas, to feel all his senses penetrated by another atmosphere, as all this changes the current of his thoughts. The person who sees fancies that sight is the indispensable intermediary between himself and things, the necessary means for this transformation. And the blind man observes within himself a perfectly similar action.

When one travels, the intellectual horizon is changed as well as the sensorial horizon. The conversations which begin, on meeting with fresh people, are quite different from the home conversations. Do not tell a blind man that he would learn to know the country he visits better by studying a geography book in his own library. He might learn to know it more completely perhaps, as you would, too, in this way, but in a less living and picturesque manner, and it would certainly make less impression on his imagination.

The mountain is specially endowed with a miraculous power for influencing even those who are deprived of one or more of their senses. I will

just mention, as objectively as I can, a few of the impressions which the least imaginative blind man must feel. In the first place, the pure, subtle, exciting atmosphere, so different from that of towns, has a healing effect on the organism; it makes all the sensations keener and, by transporting faint sounds to long distances, it widens the horizon of the blind man in all directions at the same time. The quality of the atmosphere influences most men very much, both morally and physically, but its action is often an unconscious one. Many blind persons have a keen perception of it. It has frequently been observed that they feel whether the sky is clear or clouded over, whether rain threatens, whether the air is dry or laden with humidity. The mountain atmosphere also modifies perception by the senses very thoroughly. The sun's rays are so ardent on the heights, the forests are so cool, one feels the limpid air in the evenings and the wind wafting faint aromas, Then there are the warm resinous odours which vivify the brain, the springs which surprise the ear at every step, the noisy waterfalls which make their coolness felt, and which soothe the mind without deadening it, the bells of the coaches, climbing with difficulty uphill, and those of the cattle, as they pass each other, making fairy-like chimes as far as their sound carries, telling of freedom, of fresh air and pastures; all this, although it certainly does not compensate for the sunsets and the vast horizons, lifts the soul, as it were, above itself, and although it may long for its lost paradise, there is none the less a renewal of life in which the heart and the imagination, spurred on by Nature, have certainly the chief part. Sometimes the deep voice of thunder is to be heard in the distance. After dull rumblings, come violent peals.

It is as though the curtain of the heavens were being torn asunder. There comes a dry, sinister, deafening peal. The hurricane breaks loose and the rain pours down in a rage. Earth and heaven seem to be speaking with thousands of voices at the same time. The neighbouring peaks send backwards and forwards, from one to the other, sounds like the yelling of giants. The blind man then has his share of the magnificence of Nature. He has the immediate sensation of the immensity which envelops him.

## Chapter XV

# ART

### I

Art appeals to the highest senses of man, to hearing through music, to sight more particularly by painting, sculpture and architecture. Even when it speaks directly to the heart and the mind by poetry, sight and hearing remain the essential instruments of æsthetic enjoyment, so much are rhythm, the music of words, the images evoked, the integrant elements of this, The man who has lost one or other of these senses is lacking in his aptitudes for enjoying the fine arts. The question is to what extent is he lacking? Can the sense of touch replace that of sight in the enjoyment of arts which seem to depend on sight?

Sculpture and architecture are specially interesting to us for the study of this question. It is very evident that painting cannot be considered, for, as this is the art of colours, it must necessarily be a closed door to those who know nothing of colours. As far as music is concerned, a hundred years of experience have given results deserving of note.

As long as the blind remained without culture, and for some time later also, it was generally thought that they were not capable of thorough musical development. Those who had not frequented

the blind were inclined to think that blindness causes so complete a disturbance in the whole personality that it poisons the very sources of æsthetic enjoyment. The art of music, they thought, was so complicated that difficulties of a material order must impede the way for the blind, above all the necessity of reading quickly.

At first, Valentin Haüy only taught his pupils music by way of diversion. He did not think that they might earn their living by it. When, however, later on, a number of blind musicians were to be met with everywhere, teaching and playing the organ, they seemed to prove an exactly opposite theory, a theory that had long been held by certain people, namely that music was instinctive with the blind man, and that he was endowed by Nature with gifts that enabled him to conquer, easily, all the difficulties of this art.

Both these legends are the outcome of two foregone conclusions of which we have already spoken: the first of these conclusions is the one that belittles the intelligence of the blind man and all his moral personality; the other one accords to the blind man miraculously keen senses. We have only to put these two theories side by side and they destroy each other.

As regards the former theory, it is answered effectually by experience. At the National Institution for the Young Blind of Paris, a very thorough musical education is given, both theoretical and practical. It includes the study of harmony, fugue, counterpoint, composition, and also execution, either on the piano, organ or an orchestral instrument.

A considerable proportion of the pupils prove themselves capable of profiting by this education.

Within the last twenty-five years, six first prizes for organ, and five prizes for harmony, fugue or counterpoint, attribued by the National Conservatoire of Paris, have been won by pupils of this establishment. I am not speaking now of prizes obtained for various orchestral instruments, nor of many accessits of all kinds, as these would bring the number up to fifty-one awards received by artists formed by the National Institution for the Blind.

Many of the first organs of Paris have, at present, blind organists. Among these are Notre-Dame, St. François-Xavier, St. Germain-des-Prés, St. Etienne-du-Mont, St. Pierre-de-Montrouge, St. Médard, St. Nicolas-des-champs, St. Georges, St. Eloi, St. Hippolyte, St. Pierre-du-Gros-Caillou, the Chapel of the Lazarists in the Rue de Sèvres, and Notre-Dame-de-la-Croix.

Musicians such as Louis Vierne, the organist of Notre-Dame, who teaches at the Conservatoire and takes the organ class at the *Schola Cantorum*, and Albert Mahaut, who interprets César Franck's works with such vigorous originality, are both so well known in the musical world that it is impossible not to mention them. These are facts which prove not only the artistic aptitudes of the blind, but also the excellence of the Braille method.

There are a few sceptics, I know, who have taken up still another theory. I have heard it argued that the blind man cannot have creative genius, as a great musical work demands integrity of the senses as well as integrity of heart and intelligence. Such a theory appears to me a very doubtful one. When I think that Beethoven was not blind, but deaf, when he composed his most admirable masterpieces, I should hesitate very much before uttering such daring generalities. Undoubtedly creative genius seems

to require a soul rich in sensations and ideas, but the fulness of intellectual and moral life to which the blind man may attain seems to suffice quite well for this. Music only evokes visual images for the most characteristic of visualisers. It does not contain visual imagee.

It may be urged against us that experience is lacking for proving our theory. I am quite well aware that no blind musical composer has yet conquered the public. But the number is not yet legion of musical composers of real genius and, among musicians who compose, the blind constitute a minority so small that we must not be surprised at not finding any in the first rank. Among this handful of blind musical artists, the oldest of whom only dates back to about a hundred years ago, how many of them are there whose thoughts have not been absorbed by the tyrannical anxiety of earning their living and that of their family, how many of them have not been compelled to stifle within themselves their fine ambitions, and even inspiration itself when it came to them! There may not be any great works which have had far-reaching success, but there are many works of great merit due to blind composers. I would here mention the names of Mlle. Boulay, of M.M. Brès, Chavagnat, Marty, Trépart and Vierne. A partition by Trépart, entitled *Martin et Martine*, has been heard at various theatres. Among the works by Vierne, we would mention: *Trois Symphonies pour grand orgue*, *Sonate pour violon et piano*, *Sonate pour violoncelle et piano*, *Recueil de mélodies*, *Messe avec deux orgues*. The clever music that Victor Paul has written for various fables by La Fontaine has, unfortunately, not been published, so that it is only known by a limited public.

A few years ago the notables of the musical world

of Paris were invited to a concert at which all the numbers were signed by blind composers and executed by blind musicians. The opinions of the critics did not justify the doubts which I mentioned a little while back. Neither did they establish the existence of exceptional aptitudes among these blind composers. Experience will have great difficulty in deciding this question. Undoubtedly, if fifty blind pupils were taken hap-hazard and fifty who have their eyesight, the former ones would have the advantage over the others. That, however, is perhaps because everything in our special schools is done to develop the slightest germs of musical aptitudes in the blind. For an observation of this kind to be really decisive, it must be made with a great number of children and during several years. The subject would have to have the same teaching and also be under the same influences, in identical surroundings.

It would seem as though, if blindness favorised musical development, those who become blind at an early age would have an advantage over those whose early education began with the help of their eyesight. Facts do not prove that this is so. At a recent investigation at the National Institution, I found that out of thirty workmen declared incapable of musical culture, twenty-five had become blind before they were six years old and five only after that age. On questioning thirty of the most gifted musicians as to when they lost their eyesight, I found exactly the same numbers : twenty-five before the age of six and five after that age. The later the child comes to the special school, the less chance he has of becoming a good musician, unless those with whom he lived had taken care to let him hear music. Those who come to the school after the age

of fifteen and are absolutely uneducated are, as a rule, hopeless. After the natural dispositions, which remain enshrouded in the most profound mystery, the age at which education commenced seems to be the essential factor and not the age when the blindness began.

These facts corroborate the impression I had after staying for several years in a special school. This impression of mine is also the opinion of several musicians who teach the blind. It therefore seems that we must recognise the fact that the blind are no more gifted than those who see, and that there is as much inequality in the musical aptitudes of the blind as in those of the individuals who have their eyesight.

A person who was born deaf may excel in arts which only depend on sight, and yet neither public opinion nor experience attributes to him a notable superiority in these arts. I am convinced that it is the same with the blind, and that, in a general way, the loss of one sense does not change within us the sentiment of the beautiful, and it does not exercise any fatal influence over the æsthetic enjoyments of the other senses. It can only make them still more precious to us and require us to cultivate them with special fervour.

## 2

We cannot count on much help from the sense of touch as an interpreter of art. I do not, nevertheless, believe that either it, or any other sense, must be considered as absolutely and inevitably incapable of any æsthetic impression.

Certain philosophers maintain that a gulf, which

cannot be crossed, separates the beautiful from the useful, and that the senses responsible for the most utilitarian functions can only experience an agreeable sensation, without being able to participate in what is beautiful. The æsthetic emotion felt as a result of visual and auditive sensations is not produced by those sensations. It has its source much deeper within us. It comes from the very roots of our being, from the inner depths of our consciousness, and it is capable of shading with an æsthetic tint the whole mass of our mentality, even to our very simplest impressions. If it only comes to full perfection in the most elevated sensations, it is because it is there alone that emotion is sufficiently free from all utilitarian element to be entirely purified from sensations of envy, or fear, etc., which interfere with the essentially æsthetic element. It is also because it is there alone that it meets with sufficiently rich psychical syntheses, and with associations of ideas and sentiments complex enough for supplying the full consciousness it requires. But it may everywhere be latent, if the soul has that inward fertility which transforms all things, the sentiment of what is beautiful.

The æsthetic value of a movement is not entirely inaccessible to the blind. Undoubtedly it is in the movement *seen* that this is nearly always felt, and it is for this reason that the person who sees associates it with vision And yet force, harmony and grace, all the elements which give value to movement, may reach the consciousness without the intervention of eyesight. These elements may touch the blind artist sometimes, perhaps, under conditions specially favourable, when he touches the moving body, but more often when he reproduces the movement. He sees it then, as it were, from within. This

explains how it is that some blind persons, very few I must own, have a certain gracefulness in their movements. Every thoughtful, blind person has had, at times in his life, an intuition that a certain movement or gesture of his was suitable or appropriate. The inner vision is, undoubtedly, less exact than the external perception by the eye. It has a serious drawback. It cannot be educated by the example of others. It is useful, though, as it enables the blind person to understand and to feel a thousand details of the art of those who see!

The sentiment of order, which is the æsthetic principle *par excellence*, does not belong exclusively to those who see. The blind man, too, knows this very well. I am not speaking now of utilitarian order, which is only vaguely connected with æsthetic order. The blind man is the most orderly of men. He is orderly from necessity, and sometimes his order becomes a mania with him. He can only find things if they are not moved from their usual place, and nothing is more disagreeable to him than to find pieces of furniture to which he is specially accustomed moved about constantly. He will promptly put them back himself, and he is often blamed for being indifferent about their actual position, that is about their respective arrangement. This criticism is generally well founded. The arrangement of the furniture in a room is of interest to the person who sees, but not of much interest to the blind man who does not perceive it by touch.

Of course the more his aptitude for representing places to himself by imagination develops, the more he will be sensitive to this. It is quite possible to teach him to pay attention to such things and even to give him a certain degree of taste. As a general

rule though, he does not trouble about matters of that kind.

Let us now consider things which concern the hand rather than the eye, a clock for instance, or even an arm-chair. The blind man will be interested in the outlines of these objects, in the symmetry of the pieces opposite each other, just as he is sensitive in a speech to the arrangement of the various parts.

It has been very justly remarked that the expressions used by poets for interpreting what there is æsthetic in their sentiments, and even in their visual sensations, depend on the impressions which come to them from all the senses, from the least to the noblest. Warm, gentle, penetrating, sweet, fresh, are words which come frequently to their pen.

Sully Prudhomme made a list of these qualifications which interpret both the perceptions of the senses and the various states of our sensibility. The epithets of touch figure the most frequently. There are about fifty of them and their power of expression is great. What does this signify, if not that it is not only by the spatial relations of order and movement that it perceives, but also by specific notions, such as polish, smoothness, silkiness, which touch alone can reveal to us, just as the eye alone can reveal to us black, red, white, The sense of touch has an aesthetic value not to be despised. Guyau has already insisted on this point.

« If colour cannot be distinguished by touch, » he says, « this sense gives us, at any rate, a notion that the eye alone cannot give us and which has a considerable æsthetic value, namely the notion of softness, silkiness, polish. What characterises the beauty of velvet is its softness to the touch no less than its brilliancy. In our idea of the beauty of a woman, the velvetiness of her skin is an essential

element. Colours even borrow, sometimes, a certain charm from associations of ideas drawn from touch. The idea of a very green lawn is associated with the idea of a certain softness under the feet. The pleasure that our limbs would experience on lying down on it increases the pleasure that the eye has on looking at it. Besides the brilliancy of fair or dark hair, there is the sensation of silkiness which the hand feels in stroking it. The blue of the sky itself, impalpable as it is, sometimes acquires a velvety look which adds to its charm and lends it an indefinable softness. »

Marie Heurtin, the deaf-blind girl of Larnay, in her days of untamedness, would delight in touching certain objects for hours together. She and several other deaf-blind children, before their minds were trained, were subject to violent jealousy if one of their companions had a more silky garment, or some ornament which was more agreeable to the touch, than they had. One of these irresponsibles went as far as to pour milk over her neighbour's collar. Does not this seem to give evidence of a germ of æsthetic pleasure which can be cultivated by the mind and the heart?

It has frequently been noted that the broken line in arabesques, in which the eye delights, is much less appreciated by the finger than the curved or straight line. Various explanations of this fact may be suggested. It may be that the corners of this broken line have something rough to the touch and exasperate, whilst the flowing straight lines, or the gradual arched lines, allow the finger to glide along without being stopped by any harshness. Then too, no matter how slightly the broken line becomes complicated or irregular, the sense of touch has great difficulty in realising the value of each part,

and the measure of each angle, for constructing a synthetic representation of the figure with its exact proprotions.

These æsthetic elements which we find in the analysis of the sensations of touch are, of course, likely to have a special value for those who are constantly developing their sense of touch, that is, (according to the definition we have given of the development of a sense) who enrich the notions of touch with quantities of associations and, in that way, extend their intellectual and sentimental signification. It is evident that there can be no question of constituting an art specially suitable to the touch, just as painting is the art specially suited to the eye. The blind are wretchedly poor in comparison with those who see, as regards the varied and rich impressions furnished by colours and sounds. And yet, from the affective point of view of the blind, these pleasures of touch must be mentioned. Let us imagine a voluptuous person cultivating these pleasures, arranging his life in a way that he may be surrounded by delicate contacts, having the floors of his home covered with carpets, as warm to the foot as they are in colouring to the eye, having within reach of his hand silky materials of various textures, and objects with lines agreeable to the fingers. No one can tell in what measure, aided by associations of sentiments, he might thus enrich his sensual enjoyments and how near he might bring them to the æsthetic sentiment. Without going as far as such refinements as these, the blind man, although he may not appreciate many of the decorations with which those who see beautify their everyday life, need not absolutely neglect the tactile quality of the setting that he gives to his daily activity. He can obtain from his sense of touch, which is better cultivated

in this direction, an understanding of certain of the arts of those who see, such as sculpture and architecture, and he may thus experience a commencement of æsthetic pleasure.

3

According to certain testimonies, the blind person has full enjoyment of this, an enjoyment equal to that of those who see. The substitution of the sense of touch would then be perfect. Helen Keller's declarations, which have been so often quoted, and which give such encouraging ideas as regards the æsthetic faculties of touch, are singularly affirmative. « On following lines and waving forms, » she says, « my fingers perceive the thought and the emotion that the artist wanted to render. I discover on the faces of gods and of heroes expressions of courage, of hatred, or of love, as clearly as on living faces when I have an opportunity of touching these. I feel, in the pose of Diana, the grace, the freedom of the woods, the charm which tames the lion of the mountain, and which subjugates the wildest passions. My soul delights in contemplating the expression of repose and the grace of line of a Venus, whilst in Barye's bronzes the mysteries of the jungle are manifested to me. »

At the Chicago Exhibition, which she visited at the age of thirteen, she was more especially delighted with the section of sculpture.

I should prefer feeling quite convinced as regards this, but, unfortunately, not having verified by exact observation Helen Keller's declarations, I am compelled to remain sceptical. It would be necessary to let her feel busts of distinct character, and then ask her to express the sentiments which the

artist wanted to interpret. Care would have to be taken not to mention in her presence the names of the personages represented, so that she should not imagine that her fingers have discovered all that her memory would say to her of Mars, Diana or Venus, all that her quick imagination would fling, in the way of clothing, around a mere word. Until this has been tried, we have reason to believe, not that there is nothing real in her testimony, but that with perfect good faith, which is not doubted by anyone, she exaggerates to herself her own æsthetic enjoyments, and that her emotion is a matter of auto-suggestion rather than that of perception. Helen Keller is, to a singular degree in a person of such keen intelligence, constantly the dupe of words, or rather the dupe of her dreams. Wordiness, unreal emotion and, in the worst sense of the term, literature occupy a disconcerting place in her writings. She says, for instance :

« When the first snow-flakes began to fall, we rushed out-doors, and for some hours they could be seen, descending majestically from the high regions of the atmosphere and then, silently, with a very gentle movement falling all over the country and levelling the plain. Darkness fell over all this whiteness. The next morning the scenery was entirely changed; the roads had quite disappeared and also the boundaries of the fields; a snowy desert had stretched out as far as the eye could see, and the trees emerged like so many white phantoms. »

What are we to think of so many visual and auditive impressions rushing to the imagination of a person blind and deaf, and forming so many pictures? In another place she writes as follows :

« When the ground was strewn with red and golden Autumn leaves, when the muscat grapes, at the end

of the garden, were turning brown with maturity, I began to write the story of my life. »

Do the memories of her life then date from the shades of colour of leaves and grapes? At the age of twelve, in her first autobiography, she said: « How pretty they are, these shells, with their charming colours! » And a year later, in a letter to a friend in which she describes her visit to the Chicago Exhibition, she writes:

« The day was clear and bright. The sky and the water, of incomparable blue, made the most harmonious setting to the dream city, crowned by the shining dome of the Administration building. We went slowly along on the side of the Court of Honour, stopping here and there for Miss Sullivan to describe to me the magnificent scenes around us: the groups of fine buildings, the water studded with boats going rapidly along, the majestic statue of the Republic, the fluted columns of the peristyle and, finally, the deep, blue lake. How beautiful the sight was! »

If I dwell on all this, it is not only because pages of this kind, which perplex readers anxious to get at the inner thoughts of Helen Keller, prove to us that she does not distinguish between sentiments suggested to her by words and sentiments inspired by sensations, and that, consequently, her testimony with regard to æsthetic emotions cannot be accepted without being verified. Then, too, there is another peculiarity interesting to the psychologist. Literary vanity may have contributed to developing this, but it has deeper and more interesting causes. We now arrive at the weak point of this wonderful education of a fine intelligence.

We must remember that, for Helen Keller, words have often been not only what they are for a normal

individual, the sign of sensation, always associated with it and evoking it by sheer habit, but literally the subsitute for sensation. Words have taken the place of the absent, and unknown, sensation. This is the case, in a certain measure, for the blind person who hears, but very much more so for the deaf-blind. Then Helen Keller's verbal memory was strangely exact. This was an excellent thing, certainly, as the verbal memory helped on her development enormously where words had to play a considerable part. There was, however, a great risk with this advantage. Helen Keller did not allow her mind the time, necessarily long for an individual who had only the sense of touch at her command, to obtain all the direct impressions that she might have had for these words that she had too easily assimilated. As a result of this we have all that wordiness, which was from henceforth difficult to restrain. Whole phrases, either read in Braille or from the hand of her teacher, kept coming frequently both in her conversation and in her writings, and these phrases, which she did not recognise as borrowed ones, she believed were her own. She did not distinguish between what she drew from the stores of her memory and what she owed to her own individual impressions. At twelve years of age, she published as her own, with the best faith in the world, a little story which was little more than the reproduction, in certain parts word for word, of a tale read to her a few years previously. She had lost all recollection of that reading and could not remember it again. Her childish despair was very great when she was suspected of having tried to mystify her friends. At the age of twenty-two, she wrote as follows :

« Even now I can never find the boundary line between my own ideas and those I have drawn

from books. What I have read becomes the very substance and, if I may so express it, the contexture of my mind. »

As a matter of fact it was by reading, and not by means of sensation, that her ideas, for the greater part, were acquired, and only too often her readings could not have been vivified by sensation.

This is not all. Helen Keller is endowed with a wonderful gift of sympathy. I mean that she feels, with extraordinary facility, the emotions of the persons with whom she is in communication. We are told that she likes the theatre and that her teacher transmits to her, by means of her dactylography, not only the words she hears, but the emotions with which the playing of the actors inspires her. I suppose that there is some exaggeration in this, but it is certain that the visual and auditive descriptions translated to her by Miss Sullivan, although they could not be realised by her imagination, do not fail to make a vivid impression on her sensibility. She has an affective memory which is remarkably developed. The accent is perceived and remembered with the word itself, and is an integrant part of it; it takes effect thanks to sympathy and it is this which is the cause of the emotive power of sensation. It is to this that is due the fact, attested by those who have approached her, that the poetical, visual or auditive expressions of books are those that Helen Keller remembers best and employs most frequently in her own writings. The story that she unconsciously reproduced, at the age of twelve, contained, as the essential element, the centre of her plot, a fairy-like description which seemed only likely to appeal to a person who could see.

And so, in this way, words and emotions are used without troubling about the sensations themselves,

giving the idea of the existence of sensations which do not exist. They are, as it were, working with nothing behind them. Only stubborn critical work could cure this parrot-like habit and Helen Keller was equal to this work. She has made great progress, in this respect, since her first books. Various circumstances have been decidedly against her. In the first place, she had the very natural wish, common to all infirm people, but dooming them to great disappointments, to take part in all the privileges of the rest of the world. Then, from the age of ten, Helen Keller became celebrated. This extraordinary child needed a certain serenity and calmness of mind, in order to learn to know herself. Instead of this, so many newspaper articles and persons curious to see her incited her to force her nature. Her teacher's method was to talk to her as though she were a normal child. She enjoyed the astonishment she caused and continued to talk and write as though she were a person who saw and heard. This psittacism which, in various degrees, tempts everyone, (particularly the inhabitants of Southern France, with their impressionable nature), makes introspection as regards æsthetic emotions extremely delicate. We must always beware of pitfalls when trying to find out how far the sense of touch can replace sight in æsthetic enjoyment. The blind with their vivid imagination are particularly exposed to this danger. In my opinion, it takes away all the value of Helen Keller's testimony, which has certainly been over-estimated.

She talks complacently of the æsthetic impressions which she gets from her sense of touch, not only with regard to sculpture, which is an art for sight, but also with regard to music (1). It is true that a

(1). On this second point, Professor Stern gives us very exact information.

military march, the *Blue Danube Waltz* and Chopin's *Funeral March* awaken in her very different impressions. By placing her hand on the piano, she is not only able to beat time with her other hand, but we are assured that her face expresses sentiments which vary with the character of the piece played and which harmonise fairly well with it.

From these facts we can conclude, incontestably, that Helen Keller has the sentiment of rhythm. This does not surprise us, as we know that most of the deaf-blind perceive sonorous vibrations by their sense of touch. The sentiment of rhythm belongs essentially to the touch. It is one of the principles of dancing. But this is not all. It is asserted that Helen Keller has, through touch, some impression of the heights of sounds. It has been observed that she distinguishes between two identical chords struck at a distance of three octaves. After telling her, on striking them, which is the higher, she recognises herself afterwards which is the higher one. The question is whether this can be considered as an element of really musical impressions. Personally, I doubt this very much. I do not deny that it may be possible to exploit this sentiment of the height of sounds that she possesses and to combine tactile excitations, produced by more or less acoustic vibrations, in such a way as to cause a deaf-blind person to feel more or less agreeable impressions. This may be possible, I do not know. But certainly this art has nothing in common with the art of music. Combinations which might be pleasing to the sense of touch might produce, for the ear, the impression of unendurable discord and noisy tumult. It would not be the music of those who have the sense of hearing, but a special kind which is not music, or at any rate only music of an

accidental kind which would have to be composed for the sake of satisfying the faculty of discerning the height of sounds by touch. Music is a compound of tactile-auditive sensations which constitute rhythm, and of sensations exclusively auditive. Helen Keller only perceives the former ones and when the emotive value of rhythm is not too transformed by the auditive quality of sounds, she has an impression, very weak, but exact, of the piece that is played in her presence. The extremely simple music of many uncivilised races obtains nearly all its expression from rhythm. This is tactile music, almost entirely accessible to a deaf-blind person. The more music becomes complex and scientific, the less the rhythmic element predominates, until it finally only plays the rôle of an adjuvant, and frequently even is greatly modified in its æsthetic value by the various combinations of auditive impression which are introduced one upon another. When Helen Keller described Chopin's *Funeral March*, which had just been played to her, as a *Lullaby*, it will readily be understood that, by isolating the rhythm of the piece, and particularly of the second part, she should have felt it as a lullaby. From her point of view we understand this definition, but it is very evident that Chopin's work was lost on her and that the sense of touch can only replace the other senses in a very poor way as regards their æsthetic functions.

4

In sculpture we can distinguish elements of three sorts. First there are the elements purely expressive, such as attitudes and gestures, which are signs not conventional, but natural, or manifestations

rather than signs, of the passions or sentiments that the artist wants to interpret. A certain rigidness of the face expresses anger and suggests emotions caused by this, because it is the result of contractions usually provoked by anger. In the second place, there are subjective elements, combinations of lines intended to please the eye and which suggest various states of mind, but do not express sentiments. Then lastly, there is resemblance, which in a great number of works is, too, a necessary condition of beauty.

As regards expressive elements, they consist of movements, the æsthetic value of which, as we have seen, can be known by touch. The blind man, like the person who sees, is aware of the gestures he makes when under the influence of various emotions. He shrugs his shoulders and raises his arms to express his disdain and amazement. The same gestures recognised by him in a statue will evoke within him the same sentiments. A blind child of thirteen was asked by his professor to model, in wax, a man who had walked a long way and was sitting down on the road side to rest. The child's own idea was to represent him with his two hands placed on his knees. In this way he obtained an expressive attitude and proved that gestures spoke for him, too, an intelligible language, and that sculpture is not a dead letter for the blind. In the same way, the invention of a dramatic sculptural scene could quite well be the work of a blind man. It is quite possible for him to imagine the expressive gestures of a tamer in presence of the lion that he is training, or to give attitudes of grief to the members of a family grouped around a coffin.

And yet, even for these expressive elements, which are by far the most accessible to the blind,

how very unfavourable are the conditions under which they can pursue their æsthetic education! In the first place, although they may realise the gesture as a whole, the more delicate shades may escape them, Half a millimetre more or less in the height of a shoulder is a detail not lost to the eye, but the finger would not notice it. The expressive value of a statue may be altered by it, nevertheless. But above all there is the fact that the scale of attitudes and gestures which the blind man can interpret spontaneously, and of which he feels the resonance within himself, is generally very limited. The expression of the face and gesture is fostered by sight. Not only is it enriched by imitation, but it loses when it is not helped by the sentiment that we have of its visual value, and by the encouragement it gets from the glance of another person. This is how it is that the blind, the farther they go from their childish spontaneity, gradually lose the habit of all mimicry, even of the most discreet kind, so that their faces frequently become impassive and expressionless. Thus, whilst those who see can enrich their natural gesticulation by imitation, the blind gradually give up theirs, because they do not feel the value of it. The result is that, later on, if they attempt to gesticulate in some special circumstance, in order to express some idea, their movements are not natural and ring false.

This discontinuation of one's own expressive movements would not prevent anyone from understanding, and enjoying, sculptural representation of the various passions, if one were informed about the movements of others and could substitute the series of impressions perceived within one's self by a series of impressions received from outside. A man who sees and who, through shyness, is awkward

in his gestures and movements may, nevertheless, be an excellent sculptor. It is not possible to be constantly touching the people around us, and so the blind do not get any farther in their education. In the solitude in which they live, the muscular sense is their only resource, and the inaction of this sense destroys all hope of being able to thoroughly enjoy the beauty of sculptural works.

The same two reasons, namely, the lack of education with regard to gestures and the vagueness of the notions of touch, prevent the blind from being very sensitive with regard to resemblance. Here again there are many important details for the eye which escape the most inquistive fingers and, even if they were all perceptible, in order to appreciate them the blind would have to be accustomed to touching faces, a thing impossible in ordinary social life. Each individual blind person makes progress in this direction according to his or her aptitudes and opportunities of practice. Any blind person can easily distinguish the characteristic features of the lion, the tiger, the cat and, generally, of the animals which are usually distinguished as species, rather than individual animals. Within each species, and above all within the human species, many blind men may know several kinds of faces, characterised by this or that distinctive feature, of variable number. I have never yet met with a blind person who was capable of distinguishing what was the most individual in a sculptured face.

As regards what I call the subjective expression in sculpture, this, too, is surrounded with the same difficulties. It has its principle in many associations which imply, of course, a very great experience in forms. There is now a fresh difficulty to add to the others. It is the fact that what is graceful

to the eye is not always graceful to the finger. This does not refer exclusively to spatial representation. A reflection for instance, the relation between the line and the colour of the matter employed by the sculptor, and a thousand other details that cannot be analysed, must be taken into account. Certain blind men, who have once seen, express this very well when they say: « In order to appreciate this work, we must transpose it, transport it, as it were, from the tactile domain to the visual domain. »

As far as I know no persevering experiments have yet been made, experiments both determined and at the same time rigidly controlled, in order to find out how far individuals born blind, but richly endowed as regards intelligence and the sense of touch, can go with regard to the enjoyment of the masterpieces of sculpture. The results to be hoped for are out of all proportion to the effort that would be necessary.

Modelling, which is so generally taught in the German schools, enables us to verify by facts the deductions of our reasoning. It proves that if the blind can get a fairly exact idea of what sculpture is and can understand it, there are very few capable of enjoying it and, even for those few, there are many works which must either remain closed to them, or, at any rate, not completely accessible. I am quite convinced that a world of blind people would have no sculptors, for what strikes one above all among blind people left to their own natural devices is their general indifference to works of sculpture. It may be objected that the blind sculptor of animals, Vidal, left works which are greatly appreciated. We must not forget that Vidal only lost his sight completely at the age of twenty-eight, and that until then he had worked in Barye's studio. He was, therefore,

helped by his visual representations (1). What his example teaches us, and what we learn also from many of the blind whose æsthetic education had commenced before they lost their sight, and who continue in the darkness, if not to execute masterpieces, at least to enjoy those of others, is that the characteristic features of a statue are appreciated by touch much more exactly than those who see generally imagine. Many of the blind who make no effort in this direction would also be surprised at this.

It also proves to us that the lack of experience with regard to form is much more the cause of this indifference than the insufficiency of the sense of touch. There is, I know, still the case of Kleinhans. We are told that he lost his eyesight at tbe age of four, and yet he was the sculptor of crucifixes and of many busts. We do not know much about Kleinhans, though, and we are so accustomed to fictitious legends that we must beware. How are we to know whether he was helped by someone who could see. We are told that he was ill at the age of four and it was owing to this illness that he lost his eyesight, but how are we to know whether he was totally blind, or whether he could just see enough to continue his education?

When these questions are settled, if the works of Kleinhans be really those of an authentic blind man, they should then be studied in order to decide

(1). The sculptor, Etienne Leroux, who was a friend and neighbour of Vidal's, said that as his visual memories lost their intensity so Vidal's works lost in quality. In his last years he was dissatisfied himself. He began over and over again, and attributed his failures to accidental causes.

Etienne Leroux, whose testimony is a great authority, believed that the failures were caused by the gradual loss of his visual recollections. I owe this information to Monsieur Maurice de la Sizeranne who had it from Etienne Leroux himself.

clearly under what conditions sculpture for the blind can exist. Personally, I am convinced that the conclusions, after this investigation, would be very much as follows: Sculpture for the blind would have to count on obtaining its effects almost exclusively from objective expression; its subjects would have to be chosen among those in which resemblance is easy to perceive and to obtain, subjects which are individualised by some very distinct characteristic; it would not touch subjective elements which interest the eye and, perhaps, in compensation it might elaborate others specially appealing to the finger.

## 5

Architecture, from the fact that it leaves more scope for reverie, is, I think, accessible to a greater number of the blind, but, on the other hand, it is less accessible on account of its proportions, which seem to defy the hand. The qualities that they both require are very different. Sculpture requires great delicacy of touch. For architecture everything depends on the power of the imagination for combining spatial representations.

It is a fact which has been proved that, with the blind who have carefully developed this faculty within themselves, architectural works, clearly described, and laboriously constructed by the mind, succeed in making a certain impression.

Architectural æsthetes generally admit that there is an element of beauty in the successful adaptation of a building for what it is intended for, in a library, for instance, being adapted to the requirements of the various services and the convenience of readers, of a college or University to the conditions of the

teaching given there. This is almost an intellectual element, and no one would wish to refuse the blind the enjoyment of this.

In a church, the blind man has the impression of its immensity, and for getting this impression the image that he makes for himself will be considerably helped by the sonorous sensations which will vivify it. He hears the noises of the doors echoing under the arches, the sounds of voices which carry the imagination away on its wings to a distance so boundless that no echo limits it, and particularly the voices of the huge organs which dilate our sensibility in the whole expanse of the great building. The blind man can then imagine to himself slender columns, and high ogives sufficiently concrete for enabling him to feel, with a certain intensity, that fascinating sentiment (1) of heaviness conquered and of free soaring towards the infinite.

We could, undoubtedly, continue this enumeration, consisting above all of very individual impressions, of impressions which the subject creates almost more than he receives.

They have this one feature in common, that they do not need a perfectly exact representation, they only require, from the work in question, an excitation, an initial shock. To pass from these emotions, which are sometimes very strong, but a trifle vague, to the more special emotions, peculiar to every architectural work, is a difficult thing. In the first place, in combinations of architectural lines themselves, especially when they are enriched with sculptural ornamentation, there are, of course, elements of æsthetic pleasure concerning the eye alone, and which

(1). A blind Italian, M. Romagnoli, has published a very interesting article on the impressions he experienced on visiting St. Peter's, Rome.

the most perfect touch could never know, elements which would escape a hand as large as the church itself, even if the tactile sensibility all over that hand should equal the sensibility of the pulp of the fingers. But even if we only consider the purely spatial questions, and these are the most essential of all, the necessary work for building up the representation of the edifice would tire the mind and blunt the sensibility. Then, to picture to one's self the whole, with absolute precision, giving every architectural ornamentation and the exact proportion of every detail, all this would be an enormous task and would present difficulties which, in many cases, would prove almost insurmountable.

Undoubtedly, the person who sees does not perceive all the details simultaneously, all equally clear to the mind. He, too, must make a selection, but that very selection, which is governed by æsthetic tastes, and which varies with these tastes, supposes the possibility of embracing a vast ensemble, and his liberty increases as the ensemble he has embraced grows larger and larger. In the blind man's faculty of realising ensembles, there is no fixed limit, and every effort may bring its reward. Theoretically, at least, great progress is possible, because, here just as with sculpture, the obstacle comes much less from insufficient means of perception (touch and spatial imagination) than from a too meagre experience of form, consequently from a lack of education. A blind man making architectural representations his special study might perhaps succeed in obtaining not only great erudition, which is relatively easy, but also, perhaps, a rather delicate taste and even fairly in accordance with that of the man who has his eyesight.

We can easily understand that,although a few blind

persons are interested in all that concerns architecture, not only the generality but also the élite of the blind are usually as indifferent to it as to things concerning sculpture.

Their indifference, in this respect, is based on reason. It ought to be conquered in a certain measure, in order that the blind man should not display a regrettable ignorance. Beyond this, it does not seem to me that it is worth while to make considerable efforts in this direction. A blind man should make himself capable of understanding a man who sees, when the latter is discussing arts that appeal to the eye, and to comprehend his sentiments from a description given. A few blind men can, perhaps, go still farther than this, but they must, necessarily, remain far behind those who see. They should refrain from laying claim to equal the others in this respect, and should not attempt that work of auto-suggestion which this only too frequently causes and which adulterates the pure delights of æsthetic sentiment.

6

These reserves, of course, only apply to those who are born blind or are like those born blind. As regards those who lose their sight later than in early childhood and who, frequently, for several hours a day, continue to see things in their thoughts and memory, the persistence of their visual imagination is such that they continue to enjoy Nature and also the masterpieces of sculpture and architecture like those who see. Of course the more their æsthetic sentiment was educated before darkness came upon them, the more chance there is of its being tenacious. A blind man who lost his eyesight at the age of nine, but who had spent his childhood in a

sculptor's studio, is better equipped, perhaps, for animating statues than another man who only became blind at the age of twenty, but had received no artistic preparation. No matter though to what degree it subsists, the memory of vision is very precious for colouring landscapes, for facilitating architectural syntheses, and for giving more life to bronze figures. Above all sight gives to the mind that experience of form which, when once acquired, is never lost, and which is so necessary for cultivating the æsthetic sentiment.

It is amazing to see with what intensity visual memory may be retained after many years. A blind man writes as follows:

«I lost my eyesight at the age of seven. Dr. Dufour says that every person who becomes blind in his early youth gradually loses the memory of visual things and almost infallibly forgets them entirely. I do not want to discuss the assertion of our great oculist, but I fancy that I shall have to live very many years yet before forgetting the pictures which my eyes imprinted in my memory. I grant that certain features are less vivid, certain perspectives have become rather vague, some faces have almost disappeared; but all the things which struck me, all those in which I took some interest have remained distinct, so real that I am persuaded that I should feel little surprise on seeing them if it were suddenly given me to look at them again. As I lived in the country, it is with the things of Nature that I composed my little collection of images, a treasure which I frequently delight in looking at again now. The aspect of the country in its different seasons, the fields covered with snow, with little sledges running along, meadows scarcely green, with violets just showing themselves, waving corn, flowing water,

butterflies hovering about, swallows flying, and the sky with the stars just appearing..... Can such things really be forgotten? »

Mr. Campbell lost his eyesight at the age of three and a half, but he assures us that he has very vivid visions of Nature. When he wants to have an idea of scenery, he gets several persons to describe it to him. It is in this way that he has *seen*, as he says, Niagara, the White Mountains and the Alps.

I know of a blind man who, when he was about thirty, lost his sight completely. He continues to live, thanks to his imagination, the life of a man who sees. He chooses himself the colour of his curtains, the design of his wall-papers, the material and colour for covering his chairs, the styles of his furniture. He has every piece of furniture placed in a way to get a general effect. He sees each room that he has furnished in his house and inwardly enjoys the sight that he has prepared for his visitors. He recalls at will the landscapes which he knows, and he constructs fresh ones very easily. The portraits of all his friends are very clear in his mind, and he says that by passing his hand over the face of a fresh arrival, he knows at once what this person is like. (1)

His profession of *masseur* helps him, perhaps, to keep up this valuable form of imagination, just as it helps him not to lose his keen taste for sculptural works. He likes to have such works around him. They are to be seen on his table and on his chimney-piece, and they really people his solitude.

(1). The desire to picture to himself the faces of those with whom he has to do is very strong with certain blind men who formerly had their eyesight. One of these, who became blind at the age of nine, constructs the face of a visitor who talks to him from the intonations of his voice and by his conversation. He has quite a gallery of portraits, in this way, frequently no doubt, very unreal, but he can add to this gallery at pleasure.

## Chapter XVI

# POETRY

### I

On passing from the so-called fine arts to poetry, quite another kind of problem confronts us. We had to explain why so few of the blind are interested in the plastic arts. We now wonder if it is not strange that they should have so keen a taste for poetry. Visual images have, so frequently, a large place in poetry. They are not to be found there merely as an accessory ornament, but as a means of expression and as the language peculiar to poetic sentiment, the intermediary, by means of which the emoton of the poet's soul reaches that of his reader. There is a tendency to think that the blind man lacks imagination, that imagination comes to us thanks to our eyes and the movement and variety of the outer world and that, consequently, the blind man must be less endowed with imagination than he is with reason or with common sense.

With regard to this, I fancy that words lead us astray.

Words are responsible for many of the wrong ideas in the world. The term imagination serves for two very different ideas, which conversation, for want of distinct words, does not separate sufficiently. Imagination of form, that which preserves,

reproduces and creates concrete images, is on an average much less developed with blind persons than with those who see. The other imagination, the one which is interested in the combinations of events and of characters reacting on each other, the one which builds up human lives or which delights in the thought of them, this kind of imagination does not require eyesight. It is made up of sensibility, of refined intelligence, of mobility of thought and ease in entering into the different phases of human life, of experience, of curiosity to understand and try everything, of aspirations towards the ideal and the wonderful, or of a passion for the real. This kind of imagination falls to the lot of the blind man quite as much as to the one who sees.

One has only to frequent a school for the blind to know that, among the books that are read to them, those which appeal to the imagination are the ones the pupils prefer. In that they are like other young people of their own age. Helen Keller's case is very instructive in this respect. Since she has built up her intellectual life with so few sensitive notions, we might be tempted to think that, still more than a blind person who hears, she could only deal with abstractions and that her mind would only proceed by means of logical deductions. As a matter of fact, Helen Keller did not like the study of mathematics, not that she was incapable of making progress in such studies, but, in what Bacon calls the intellectual globe, her tastes carried her away to the very antipodes of the abstract sciences. Literary studies, which have made her what she is, always delighted her, and the great masterpieces of the human mind, in which imagination has a predominant part, the works of Shakespeare, Goethe, Schiller, supplied her with daily food for her brain. She drew from

them the deepest joy. Her thought is made up of imagination and enthusiasm.

On entering the Harvard University, her disappointment was very great. She felt, from the very first, repelled by the precise methods, by means of which people endeavour, nowadays, to understand more thoroughly works of the past.. There were the criticisms of the text, philological and historical commentaries, and all that scientific apparatus which runs the risk of crushing all emotion and making the intellectual element take first rank.. With a great deal of naiveté, but also with significative vehemence, she assures us that for a great work the best of commentators is a keen and penetrating sensibility. She reads with her imagination and her sensibility more than with her reason, or rather, her reason is thoroughly impregnated with imagination. Her preference for poetry, above all works of imagination, has no doubt the same foundation. It is evidently for its substance that poetry fascinates her much more than for the sensitive qualities which distinguish the verse. Leaving aside for the moment the visual elements, the music of the verse could only have been accessible to her very incompletely and with much difficulty, and only in the measure in which touch can grasp the rhythm of it.

2

The blind person who hears has an incomparable advantage over Helen Keller, who, nevertheless, enjoys poetry very keenly. The person who hears can enjoy to the full the musical elements of the verse and of the strophe. We know what a prodigi-

ous power of expression there is in this for a sensitive ear. Music and poetry have the same god, Shakespeare tells us.

The blind have been credited as being specially capable of judging poetical form. We have been told, in support of this theory, of certain blind persons of German language who discovered, with remarkable exactness, verses which were hidden in a piece of prose, or talking together for some time in iambic quinzains or in trochaic quatrains of irreproachable form. The idea of the blind having any superiority in this respect leaves me dubious, I must confess, as indeed the idea of any musical superiority whatever. Perhaps, though, it is due to the fascination of rhythm among the blind, whose muscial aptitudes are generally cultivated, that we have so many versifiers among them. They have a perfect mania for riming, much more so, certainly, than those of equal culture who have their eyesight. Just as with the latter, though, we are indebted to this mania for a quantity of so-called poetry of lamentable mediocrity. But imitation and psittacism cause here effects that are exceptionally deplorable. The lack of inspiration is only too often manifest by a crowd of visual epithets which ring false. Under a more refined form, we find the same indigence with certain versifiers, who, wishing to avoid the pitfall that has been pointed out to them, set themselves the task, by an enormous effort of work, of avoiding visual epithets, or of erasing them in case a few have escaped them, and they imagine that their work is poetical if they have succeeded in this little exercise of patience.

All blind poets do not, of course, belong to this category. From the lyrical collections of some of them, it would be possible to obtain a little anthology,

in which one might give the poems telling us of the bitterness and the disappointments of blindness, or of the joys and hopes which are the consolation of the blind, and which enable its victims to care once more for life. We should then have a work of real psychological interest, in which poetry with sincere sentiment and delicate expression would not be lacking. We give as an example the most striking, if not the best, of the poems by Madame Galeron de Calonne, the well known poetess who is both blind and deaf:

Qu'importe?
Je ne te vois plus, soleil qui flamboies,
Pourtant des jours gris je sens la pâleur;
J'en ai la tristesse : il me faut tes joies.
Je ne te vois plus, soleil qui flamboies,
Mais j'ai ta chaleur.

Je ne la vois plus, la splendeur des roses,
Mais le ciel a fait la part de chacun :
Qu'importe l'éclat? J'ai l'âme des choses.
Je ne la vois plus, la splendeur des roses,
Mais j'ai leur parfum.

Je ne le vois pas, ton regard qui m'aime,
Lorsque je le sens sur moi se poser.
Qu'importe? Un regret serait un blasphème :
Je ne le vois pas ton regard qui m'aime,
Mais j'ai ton baiser.

Mes yeux sont fermés, mais qu'importe l'ombre?
J'ai trop de rayons et j'ai trop de jour
Pour qu'il puisse faire en moi jamais sombre,
Mes yeux sont fermés, mais qu'importe l'ombre,
Puisque j'ai l'amour?

The work of the English poet, Blacklock, is not strikingly original and does not settle the frequently discussed question, as to whether there could be a great blind poet? I do not venture to speak of the blind poet, Aboul Ola, of whom the Arabs think a great deal. Whether or not his poems should prove

a decisive testimony, and in spite of the fact that the blind man's means of expression must necessarily be relatively limited, my reply is in the affirmative. When one thinks of certain pieces by Lamartine, of those pieces the orchestration of which is so powerful, the value of which consists in the sentiment and the music, pieces in which sight is not concerned, one is quite ready to believe that a blind poet may some day appear and realise the wonder which, for so many centuries, humanity has attributed to our old Homer. His blindness, as we know, did not prevent him from being richly endowed with sensibility and with imagination.

It is a strange mistake to think, as people often do, that a blind man's style, either in poetry or prose, is necessarily abstract. Read the page of Flaubert quoted by Guyau. It is of sensorial richness and of remarkable colouring, and yet you will not find one visual impression in it, nothing, in fact, but what a man born blind might have felt and written.

«She went out. The walls trembled and the ceiling seemed to crush her. She went down the long path again, stumbling against the heaps of dead leaves which the wind was scattering about..... She was only conscious of herself by the beating of blood in her veins, and this seemed to her to be making a deafening music which filled the whole country round. The ground beneath her feet seemed to be more soft than a wave.. She did not remember the cause of her horrible state, that is to say the money question. It was only her love that was suffering and she felt her very soul leaving her as she thought of this, just as the wounded, when dying, feel their existence passing away through their bleeding wound».

3

It will readily be admitted that the man who has his eyesight can enjoy a blind man's poetry without any effort. With his five senses, nothing will escape him of impressions furnished by four senses. He may find that there is something lacking before very long. But, on the other hand, can the blind man, with his four senses, realise all the impressions that the man who sees has put into his poems, impressions that he has written in a language formed by the notions of five senses? And will not what he misses be all the greater from the fact that the sense which he lacks often plays the chief rôle in poetical expression? It has been argued that, for a blind man, only the poetry of the blind can have all its full power of evocation. One simple statement of fact will serve to answer this question. I have noticed that Victor Hugo, the great visualiser, is very much appreciated by the blind. I might almost say that he is even more appreciated than Lamartine.

A poem is not a definite sum of determined impressions which are transmitted, always alike, from reader to reader, and in which the actions of each sense are represented by a fixed fraction. If it were thus, the emotive power of one of Hugo's poems would be reduced, for a blind person, in the exact measure in which the poet had translated his emotion in visual images. A poem is a stimulant for our faculties of sensibility and imagination. It is a canvas which each one of us embroiders according to his own taste. We feel it with our imagination, with our sensibility and not with the imagination and sensibility of the poet. On reading it, we are creators as much as we are on-lookers. The blind substitute, in this way, I do not say for

all the visual pictures, but for a great many of them, equivalents which enable them to avoid losing the fruit of these.

In the first place, when it is merely a question of an evocation of form, a few words will show that, unlike what we have said with regard to what takes place for sculpture and architecture, spatial representations, which are the result of touch, and muscular images suffice for this substitution. Many blind persons have, as we have already seen, the most fertile imagination with regard to spatial images, and although these images may not acquire the complexity and precision, sometimes required, without a great deal of trouble, this defect is not of serious importance as regards the visual images evoked by poets, as such images are rarely overcharged with detail. The works of the painter, the sculptor and the architect are seen at a glance, but the poet, as words describe objects one by one, is reduced to analysing his perception, just as the touch analyses spatial representations for the consciousness of the blind. It is only in exceptional cases, therefore, that he can impose on his reader a long and difficult task of construction. He contents himself with ordinary representations which can be evoked by a word, and in these representations he simply makes one or two special features stand out in relief. Hugo himself, as Monsieur Huguet has clearly shown, Hugo, the powerful visualiser, simplifies the form of objects and reduces their lines to certain very distinct, geometrical types.

In this way, if the blind man has been able to acquire, by means of a suitable education, sufficient knowledge of the outside world, he can quite well figure to himself the objects which the poet uses for his metaphors. The blind man gets all the poetry

out of these, not only when they have an almost exclusively symbolic and in a way intellectual value, as is frequently the case even with the greatest writers, but even when, on their own account, by the many associations they call up, by the mass of vague impressions that their image awakens in all parts of the consciousness, they require to be imagined very strongly as a whole. Take, for instance, the collection of metaphors drawn up by Monsieur Huguet for studying the sense of form in Victor Hugo's writings, I see nothing there or very little, at any rate, that would escape a blind man. Do not let us conclude, from what we have said about the difficulties which architecture presents, that architectural metaphors, in which Victor Hugo delights, are lost on the blind man.

When Hugo compares a forest to a church, it is evident that he does not ask his reader to call up in his imagination a precise image of a certain church. He evokes the columns figured by trees, the arched roof formed by interlaced branches over our heads, the religious mystery which the silence makes us feel, but he does not ask us to finish this rough sketch in all its details. He appeals to all the forces of reverie peculiar to architectural design, to just the elements which, in the art of architecture, are the most accessible to the blind. I would say the same with regard to scenery. If Hugo's landscapes did not include colour and light, if they were only defined by form, the blind would be able to realise them very completely.

Constantly, around the vast ideas that he is treating, Hugo suddenly opens immense horizons, at which his reader gazes in deep emotion. He is constantly increasing or diminishing the concrete space surrounding us, and these flashes of light, these

effects of distance, as it were, are one of his usual methods for giving to his style an epic character.

They are not lost upon the blind. This is another of the kind of images that, thanks to tactile space, can be realised under a form sufficiently concrete in their vagueness for acting strongly on the sensibility. The blind man has, sometimes, the sentiment of a vast, open sky. He also feels the sky over his head veiled, as it were, and stifling. He imagines horizons that stretch out indefinitely before him and others quite near, hedged in, as it were, by clouds which drive one's thoughts back upon themselves. He expands under the influence of the former, and feels restraint under the latter. The very terms which come to our minds for translating these impressions indicate that muscular images are probably united with the pure spatial representations for forming such impressions. There is a whole class of visual images, in poetry, for which muscular images serve as a natural substitute : they are those which represent movements, and more particularly the gestures and attitudes of the body. They have a considerable place in poetry, as they have in the arts. But whilst sculpture fixes them at a given point, poetry is satisfied with only suggesting them; it sketches them, as it were, and leaves the imagination free to finish them in its own way. It will readily be understood how much more striking they are for the imagination of the blind, which is never very plastic, and which feels movements from within rather than from outside. Not only all the movements of the human body, but also those of animals, and those of all the objects which poetry animates with its magic wand, have, in a way, two faces and are susceptible of a double interpretation. Take, for instance, the beautiful lines of Jean Aicard :

« Sois un abri sûr à mon rêve,
Un nid doux et tiède, où mes vers
Attendront, non loin de la grève.
Que leur aile au vent se soulève
Pour s'en aller par l'univers. »

This graceful taking wing of poetry, for its flight through space, can be perceived in two different ways. For some it takes the form of a visual image; for others it is felt like a muscular impression. The person who sees usually chooses the former interpretation and gives more or less relief to the picture, according to the power of his own visual imagination. The blind are more inclined to take the second interpretation.

As a matter of fact they are not in opposition to each other, and the emotion of the gesture can be felt just as keenly in both cases. The value of a visual image is in accordance with the impressions of all kinds that it combines, with the experiences of taste, smell, touch, etc. with which memory penetrates and colours it. In the example that we are considering, muscular impressions constitute, in an ordinary way, the essential part of it. They are the very pith of it and, in a general way, the impressions of the blind and of those who see, although produced by different methods, are much less unlike than one would imagine.

In order to be better understood, I chose purposely an instance in which the visual image is somewhat vague, and can be replaced easily by a muscular image. I believe though, that with the blind, usually, this kind of substitution goes very far. It even extends to things which the poet does not really animate, but the movements of which, thanks to an unconscious anthropomorphism we assimilate to

our own movements. I would almost say that this extends to all things which move.

Vague muscular impressions seem to me to make such lines as the following as keenly felt, and as picturesque, for the man born blind as for the person who sees :

« *Et, souple au gré des vents*
*Sa robe sur son corps se moule en plis vivants.* »

4

All this comes back to the same thing, that is to say that the blind man enjoys the poetry of the man who sees, with his own experience, and that reality as he perceives it may, like the reality of the man who sees, be entirely impregnated with poetry. Words correspond to sensorial syntheses which vary with individuals. Like all readers, the blind man substitutes his own syntheses for those of the poet. They are no doubt turned and modified by the poet, who brings out this or that characteristic, but they are not transformed.

When the characteristic of the object placed in relief, and from which the poetry springs, is a purely visual characteristic, in the case, for instance, of a metaphor the force of which is not so much in its form as in its colour, or in the light in which it is bathed, it is very evident that nothing can make up for this. It causes psychological work though, which is interesting to observe.

The blind man's imagination never fails to attack these mysterious objects. It fights them with obstinate curiosity until it obtains from them something of their secret. The blind man sometimes astonishes those who have their eyesight by the cor-

rectness and precision with which he speaks of things concerning vision. They even wonder, on hearing him, sometimes, whether notions of colour and light are not innate, transmitted hereditarily as a patrimony. Without dwelling on this hypothesis, let us remember the intuitive force of human intelligence, and how it at times makes use of subtle and ingenious analogies for approaching what it cannot actually reach.

As a matter of fact, it frequently happens that visual impressions are not completely lost on the blind. Undoubtedly they never enjoy the most minute fragment in all its purity, but, by means of equivalents, they get near enough for obtaining a share of emotion from them. This is the case more particularly, I think, with those which imply less the perception of the sensations themselves, than of a relation between these sensations. A similar relation perceived between sensations other than those of sight, between acoustic sensations, for instance, which by their complexity are most like those of sight, may more or less satisfactorily take the place of these.

Notions of brilliancy, of dim lights, of graduated colours, all notions which poets themselves express sometimes in terms borrowed from the languages of senses others than that of sight, have in this way a poetical value for the blind as for those who see. Let us take, for instance, such terms as a striking light, a scale of shades, a thick darkness, streams of light.

A man born blind is conscious of more than words when he reads the following lines from Victor Hugo :

> « Comme brillent sur l'eau des nocturnes nacelles
> Ou comme, de fenêtre en fenêtre, on peut voir
> Des lumières courir dans les maisons le soir. »

or again :

> « Et mon camp éblouissant à voir
> Qui, la nuit, al umait tant de feux qu'à leur nombre
> On eût dit que le ciel, sur la colline sombre,
> Laissait ses étoiles pleuvoir. »

He feels an impression capable of attaining real intensity. This is because all here depicts contrasts of light and shade. As we know, especially from the *Contemplations*, these contrasts are continual and violent in Hugo's poetry. They speak a language intelligible to the blind man, perhaps because he compares them unconsciously with contrasts of silence and of great noise.

The brutality of lightning has also its acoustic equivalents and so, also, has a burst of sparks, the frequency and the brilliance of which can be translated musically. The epithet obscure, which is so frequently used in relation to forests, lends itself not only to transposition into the acoustic language, but it could also be transported into the tactile domain. Skin impressions are quite different under the cool shade of trees and in the sunny atmosphere of daylight. Rays of warmth give a very clear idea of what rays of light may be and, combined with notions easy to acquire, allow the blind man to picture to himself fairly well what the field of vision is.

These acoustic and tactile materials, which are only means of interpretation, do not crop up in the imagination. Of themselves they are indifferent. They merely constitute the unconscious substratum (so accessory that it is only analysable with great difficulty) for interesting emotions which alone appear on the scene of the consciousness.

The page which we give below does not read like the page of a blind man. It is taken from a book by Oskar Baum, a German novelist of great talent, who

lost his eyesight at the age of three, and who had no remembrance of having seen in his early childhood. It shows us how far the imagination of the blind may go with regard to the things of sight (1).

« The hours of the day that Friede loved above all others were, towards the end of Spring, from five to seven, when the sun was about to disappear. Wherever he happened to be at that time, either at home or with his friends, he would remain with his eyes fixed on a patch of sunshine either on a wall or on the ground. The dance of the sparkling gold dust, which was no longer blinding and which gradually became more pale and wan, as though veiled, a very finely spun golden tissue, stirred by a trembling movement, that was what he loved. And when the sparkle gradually faded from the yellow patch, he would slowly lift his eyelids and let his gaze rest on the sun's rays, in order to get more and more gold, a dance more and more rapid. More vast and more stormy still, the sea of light kept swelling, crossed now and again by silvery corpuscles, which shone with keener and keener brilliance as the eye gazed higher and higher. The stream of vivid light could no longer be endured. He would then go to the window. In one last tension of his whole being, he would then lower his spectacles and fix the pupils of his eyes, for an imperceptible instant, full on the stream of light. »

## 5

Even when the blind man cannot have recourse to analogy for getting the emotive force of visual sensations, his mind does not remain passive and they

(1). Oskar Baum. *Das Leben im Dunkeln*, Berlin, Urel Juncker, 1909, page 7. The translation is as literal as possible. Friede, the hero of the novel, is just beginning to lose his sight.

are not for him as though they did not exist. The terms red, light, white, which only have a visual meaning, are not for him mere sounds. Gradually, thanks to experience and to plenty of reading, associations of ideas have formed themselves around these terms, and have finally put something into them. If you speak, in the presence of a blind man, of a light coloured dress, even without any context, the impression produced in him is not at all the same as that which the words « a black dress » would produce. The sun's rays, the gay songs of fête-days, the liveliness of evenings when there is dancing, all this has penetrated and impregnated the idea of the light coloured dress; whilst the tears of days of mourning have darkened the black dress. I know of a blind boy of eleven years old who, on his confirmation day, was deeply moved at the thought, I might almost say the sensation, that so many little girls standing in rows, along which he passed, were all dressed in white from head to foot. The word white, for him, had borrowed a magic virtue from the all powerful ideas, that day, of candour, purity and innocence.

These associations, which give emotive contents to visual terms, explain to us, without justifying it in the least, how it is that blind poets make use of words which have no sense except for those who see. They would not be tempted to do this if the words had no sentimental value for them. By constantly hearing that grapes turned brown, Helen Keller associated with the expression turning brown all the savour of the grape when it has reached its highest degree of ripeness. She finds in that term all that she has placed in it of sensations of smell, taste and touch, all that she has also put into it of sentiment.

This work of association is singularly helped by poetry. In poetry, the visual image is rarely indifferent; it is usually accompanied by sensorial images of another order, and above all by a whole series of sentiments which emphasize it, which show it up, and which make it significative even for the blind. Guyau has very wisely said :

« In order that the representation by the poet of a visual sensation, indifferent in itself, should produce its effect on the reader's mind, it must be surrounded by sensations less passive and mingled with moral sentiments. »

These less passive sentiments and these moral sentiments illuminate the visual image for the blind. Read the following phrases from Flaubert :

« They did not speak to each other, as they were too much lost in reverie. The tenderness of the old days came back to their minds, rich and silent as the river which was flowing along, soft as the scent of the syringa, bringing to their memory shadows as measureless and as melancholy as those of the still willows stretching out over the grass. »

Every sensation is here like the material form of a sentiment and the sentiment seems to express it in return, so perfectly do they both coincide. The intensity seems to be doubled for any one who perceives the two terms at the same time, and to be translated for those who only perceive one of the two.

Then too, a metaphor which depends above all on colour is often followed by other qualities appealing to the senses. When Victor Hugo calls apple-blossom « the snow of spring-time, » it is undoubtedly the whiteness of the blossom which brought the idea of snow to his mind; but, like the snow, the blossom covers the whole tree and is as light as snow-flakes. All these secondary similarities, perceived perfectly

well by the blind, help them, not certainly to realise the whiteness of apple-blossom, but to evoke, by means of the apple-trees, associations of sentiments which they have been able to group around the whiteness of snow.

Upon the whole, the metaphors peculiar to classical poetry had no other value. Instead of saying a white arm, we read of an alabaster-like arm, an arm like snow, ivory or marble. We also read of a lily-like face, of ebony-coloured hair, of golden corn, of coral lips and pearly teeth. All this was not an attempt to paint objects, but to stir up associations of sentiment by which they would be glorified. These associations might vary according to the context: a lily-like face might be a face dazzlingly white, but it might also be a face of sickly pallor. The blind man, as far as he can, will extend this method of interpretation to the suitable words which, according to the poet, represent the sensitive qualities of things: yellow, for instance, white or red. Victor Hugo, just as he simplifies the form, neglects all the variety of shades, which he leaves to painters to distinguish. He reduces their endless number to a small number of very decided colours. The task is thus greatly facilitated.

In this way, a word which leaves no image in the sensorial memory engraves one in the affective memory. What that word contains is made up of the purely subjective impressions it arouses. Undoubtedly we are now in so individual a domain that no analysis can aspire to any universal value. We may add though, that very often the word is not the sole support of these sheaves of emotion. They are also frequently bound together by rudiments of representations borrowed from other senses. It is a well known fact that with many blind people the

names of colours evoke acoustic impressions, in the same way that with certain persons who have their eyesight sounds are associated with particular colours. Has it not even been proposed that, in order to increase their effect, orchestras should be accompanied by plays of colour? With one blind man the word red evokes the sound of a trumpet, undoubtedly because the epithet startling is applied equally to red and to the sound of a trumpet. Another one declares that blue suggests to him the sounds of a violin, and white those of a small flute. Still another one hears with the word pink a dominant seventh chord.

Instead of sentiments or impressions of hearing, the associated elements may be impressions of touch, and with those who have a keen sense of touch it is these with which we meet more particularly. A blind person, who lost her sight at the age of three, told us that as a child she had had certain objects which were blue and soft to the touch, more particularly a doll's frock, and that ever since she has always associated the idea of blue with something soft to the touch. The idea of dark green irritated her, probably because she had been obliged, towards the age of four, to wear a green eye-shade, against which she had fought with her feet and her hands. With regard to the other colours, they seemed to have something both tactile and auditive. White, she said, suggested to her the coldness of a voice refusing something, or the impression of a cold, smooth contact, that of certain papers or stuffs. Yellow was associated, in the two domains, with something agreeably sharp, and brown with something indifferent and indistinct.

These associations, which vary according to the kind of imagination, seem to be very feebly developed

with intellectuals. An attempt has been made in the way of methodical investigations on this point. Lists of each colour have been made, with indications as to the various interpretations proposed. It goes without saying that there was the greatest diversity in the testimonies obtained, and that such investigations have led to no result. They have merely shown the extreme variety with which different minds fill the empty words furnished them by their experience. These notions do not represent any enrichment for the brain. It constructs them with its own materials These materials are indifferent ones, and they do not crop up within the consciousness when the blind man reads the words red, white or black.

## 6

I have had an opportunity of noticing that the reading of works written by talented blind men evokes, sometimes, within the mind of the man who sees, rather exact visual images. This was the case for works by Oskar Baum. It does not follow that this author has visual images. The substitutions of all kinds which we have just been studying, substitutions of spatial representations, of muscular images, of associated ideas and sentiments, of all that is borrowed from other sensorial domains, will suffice for explaining this mystery. In the same way that Herr Baum translates into muscular images the visual images of his authors who have their eyesight, so those which appear to him as muscular images may to his readers come under the aspect of visual images. Each of the two perceives a different face of the same reality.

But above all we can understand that, thanks to

these substitutions, the man born blind may very often succeed in getting in unison with the sentiments of the poet who sees. He enjoys poetry which I will not call entirely visual, but from which visual images are not banished. Symbols, the object of which is to give a concrete form to thoughts and sentiments, are of as much value to him as to the man who sees. He enjoys thoroughly, not only a symbol like *The Broken Vase*, in which the material foundation interests us less by its precise qualities than by the dramatic accidents of which it is the theatre, but he even enjoys a symbol as rich and as sculptural as Victor Hugo's celebrated poem: *The Cow*, which expresses, by its whole attitude as well as by the little picture of which it is the centre, that powerful and impassible fecundity of Nature which the poet wishes to translate to our senses. It is indispensable to get a strong impression of it in order to feel all the poetry of the piece flowing within us. Explained and illuminated, as it were, by the idea that it is to illustrate, it stands out in relief, with great clearness, in the imagination. It does not necessarily remain, for the blind man, in the back-ground, behind the idea from which it borrows the vigour of its features, and without giving back in exchange any light. Enriched by the idea, the symbol enriches the idea in its turn, and gives it back a hundredfold what it has received.

I fancy that the blind realise as fully as those who see the poetry of lines auch as the following, in which we find again all the various kinds of substitutions which we have already mentioned :

> « Quand le vent du malheur ébranlait leur vertu,
> Qui de nous n'a pas vu de ces femmes brisées
> S'y cramponner longtemps de leurs mains épuisées,
> Comme au bout d'une branche on voit étinceler

Une goutte de pluie où le ciel vient briller,
Qu'on secoue avec l'arbre et qui tremble et qui lutte,
Perle avant de tomber et fange dans la chute.

It does not even need to be supported by a symbol. Here are lines which one would consider quite visual and which, nevertheless, do not escape the blind man.

Tes yeux tes grands yeux aux longs cils qui tremblent,
Ils éclaireront pour moi le chemin. (1)

If these transpositions are made so easily and if there are so many of them, it is because poetry, on account of its very nature, only exploits, with great reserve as a rule, in the visual image what is absolutely visual. It cannot, like painting and sculpture, expect to get its effects from the variety and delicacy of shades, from complexity of design, from the finish of poses and gestures, unless it can count on the reader for collaborating with a vigorous visual imagination. Poetry, and literature generally, prefers exploiting in the visual image all the extra-visual emotive forces that it contains, that it synthetises, and from the substance of which it enriches itself rather than mingles with it. It is precisely these muscular impressions and these associated ideas, deposited by human experience in the visual image, that we have seen the blind take back again, in order to turn them to account. What is called colour in literature does not consist chiefly in the visions which the poet brings before our eyes. It is more often made by impressions of all kinds which it is the mission of

(1) It is interesting to note that these lines were written by a blind person, by Madame Galeron. As Madame Galeron remembered having seen, though, this fact loses some of its significance.

his description to suggest, impressions which come from the muscular sense, the vital sense, from all the senses together, and also from all the sentiments of the heart. General terms such as flower, bouquet, which poets use so freely, do not actually paint; they cause agreeable but vague impressions to spring up within us.

The following portrait in two lines is one that the blind can perfectly well realise :

> « Je vois ses bras, son front, sa lourde chevelure,
> Son petit cou d'oiseau, les fleurs à sa ceinture. » (1)

It is evident that when, yielding to fleeting fashions, literature prides itself on competing with painting and sculpture and adopting their methods, the better it succeeds in this, the more inaccessible it becomes to the blind.

The works of Théophile Gautier and of Théodore de Banville often bewilder them, but less frequently and less completely than these authors would have imagined. The Parnassian art would often be uncongenial to the blind, if the majestic music of its verse did not rehabilitate it. The interminable descriptions, so much in vogue in novels of last century, still disconcert the blind. Since the wind has turned though, how many other readers share the sentiments of the blind on this point !

When literature does not deviate from the wide road which belongs to it, the faculty of enjoying it depends on quite other qualities more than on the keenness of the senses. It depends on our personality, which the senses help in developing, but which they do not make. Undoubtedly the infirmity of the blind man acts on his poetical preferences and on the

(1). Albert Samain, *Polyphème.*

choice of his readings, but it leaves him great liberty in his tastes. The delightful descriptive poetry of Jean Aicard, for instance, contains certainly more terms that are dead letters to the blind than that of Victor Hugo. But do not, for that reason, prevent the blind from reading Jean Aicard. His warm, sonorous landscapes speak to all the senses at the same time; his poetry well deserved being transcribed for the Braille Library and it has received a hearty welcome there.

## 7

Those who know what power the sentiment of the beautiful has for awakening, and for rendering prolific, our psychical energies, for purifying our sentiments, for urging on the vital rhythm and inspiring us with generous wishes, those alone will understand what rôle poetry and music may hold in the life of the blind. The more that direct intercourse with Nature is difficult and incomplete for the blind man, the more need he has of art which interprets Nature, which, with its wonderful power of suggestion, makes the beauties of Nature accessible to him and extends his affective experience in every direction.

Art, under the two forms which the blind man can fully appreciate, is a precious comforter and stay for him. When blindness suddenly comes to a man, it frequently throws him into a state of prostration which seems hopeless. For the more delicate, the more cultivated and tempered souls, art is perhaps one of the least fragile of the various means of rescue that could be offered. Who shall say all the consolation that such men as Milton and

Augustin Thierry drew from art, after devoting themselves to the beautiful no less than to the true. I know of many other less celebrated blind persons who have been helped just as efficaciously by art. Madame Galeron has told us of all the light that Victor Hugo's poetry brought to her in the midst of her darkness :

« Oh jadis, que de fois, maudissant mon malheur,
M'enivrant du calice amer de la souffrance
Et chassant loin de moi tout, même l'espérance,
Que de fois, révoltée et pliant sous le sort,
Désolée, insensée, ai-je appelé la mort !
Vous avez retiré mon âme de cette ombre !
Vous en avez banni l'idée étroite et sombre.
Quand je compris vos vers, ô poète, ô sauveur !
Une nouvelle vie a fait battre mon cœur.
Telle une fleur éclose au sein de la tempête
Tremblante et n'osant pas même lever la tête,
Inclinant par degrés son calice vermeil,
Meurt d'ombre : tout à coup un éclatant soleil
Vient ranimer sa vie à son rayon de flamme ....
Et le rayon, c'est vous ! Et la fleur, c'est mon âme. »

# FIFTH PART

# PSYCHOLOGY OF THE BLIND IN SOCIETY

## Chapter XVII

## CONDITIONS OF ADAPTATION TO SOCIAL SURROUNDINGS. THE GREAT SUFFERING OF BLINDNESS

### I

The individual psychology of the blind has revealed to us that they do not constitute a class, as those who see usually think; that they even present, from the different points of view that we have examined : intelligence, physical activity, spatial imagination and the affections, a great psychological variety, and that they are, consequently, capable of living the social life of those who see.

Our study has given us something definite with regard to the question so long debated concerning the connection between the senses and the intelligence. « *Nihil est in intellectu quod non ante fuerit in sensu,* » said Locke. Leibnitz corrected this formula by adding : « *nisi intellectus ipse* ». We see how right Leibnitz was in making this re-

serve and how great this inner power of intellect is in individuals like Helen Keller and Marie Heurtin who, although deprived of nine tenths of our sensations, arrived, notwithstanding, at a complete development. The necessity of outside excitation is proved by their example, since the awakening of their personality was delayed until the day when this excitation took place. On the other hand, this shows also that the results are not at all in accordance with the quantity of these excitations, so that the essential factor is here the inner factor.

Psychical life consists essentially in a choice made among all the too numerous elements which reach our consciousness. The rôle of attention is to retain certain of these, in order to make the very most of them. It implies distraction, which is just the opposite faculty, the faculty of neglecting, or of rendering less evident the elements upon which the attention does not dwell. In the refuse that the person who sees neglects in this way, the attention of the blind man can glean something for constructing a life less rich, undoubtedly, but nevertheless of a magnificent development. In the same way, in the refuse left by the blind man who hears, the man who is deaf and blind can still find valuable elements of psychical life.

Still more, and readers who have followed me will have understood that the resources thus offered to the choice of the blind man's attention are so abundant, that it can choose between very diverse forms of life, and that it is by no means compelled to a certain choice by the supposed penury of these resources. More limited than the man who sees, undoubtedly, in the domain of physical activity, since many things are inaccessible to him, the blind man has the same freedom in the domain of intellectual

and affective reactions. We cannot insist too much on this truth, which is constantly being contradicted, not perhaps by opinions carefully elaborated, but by impulsive ideas. One constantly hears people repeating over and over again : the blind have such and such a characteristic; they are endowed with an exceptional force of attention, they are musical, they are distrustful etc., etc. By what are considered irrefutable arguments, people will deduce from a man's blindness his whole mental and moral being. Hasty generalisation is one of the most common vices of the human mind. How many people after making the acquaintance of one single blind man, will unconsciously make all the others just like this one. If he happened to be intelligent and active, the blind are then intelligent and active; if he happened to be lazy and incapable, so much the worse for all the others. Those who try to help the blind to obtain work know to what extravagances this instinctive disposition leads. We have heard people refusing to accept a blind man as organist, not because a blind man in the neighbourhood happened to be a poor organist, but simply because he had a disagreeable character or he was not honest. This enforced solidarity, created gratuitously for them, is very hard on the blind. It comes from the fact that we attach excessive importance to the factor of the senses, in the formation of the human personality, to the detriment of the inner factor. Blindness seems to be of such consequence that the whole soul depends upon it. And yet if Helen Keller, in her works, appears to us as a being essentially free, if we feel that, in different circumstances, she might have been quite another person from what she is, how much more true this must be of a blind man who, besides all the resources of Helen

Keller, can also utilise acoustic sensations, which are the most varied and the most synthetic of any sensations after those of sight.

It seems evident that with the blind person, as with the person who sees, the forms of activity of the imagination, of the sensibility, even of thought, must necessarily vary according to whether this or that function be predominant : the auditive function, the motory function or the tactile function. I am borrowing from a Russian psychologist the following descriptions :

« The blind boy, Kodia, lives principally by hearing. In the morning, when he is still in bed, he listens to the noises in the street and judges from them when it is time to get up. « Boys, get up ! » he calls out to his comrades, « the carriages are coming to the stand ! » On entering the lavatory, Kodia knows at once, from the sound of the taps, which basins are free and he makes straight for one of these and begins to wash. His movements are so unhesitating, and so exact, that it seems to those around him as though he must be guided by sight. His eyes, however, are completely sightless. Along the corridors and on the stairs, he walks quite easily and never knocks against the other boys, as his ear receives with precision the sound of every touch. He locates this exactly, and this enables him to direct his own steps correctly and safely and so avoid all obstacles. In the garden, Kodia frequently goes off alone, as he likes to listen to the rustle of the trees. He has carefully studied the whispering of the leaves of the acacia, the poplar and the wild olive trees and, according to the rustle of the leaves, he can tell the names of the trees which grow in the garden. He loves the storm and the sighing and whistling of the wind. In his choice of playthings, he prefers

those which have some sound; metal, the whirring of tops, and the musical box delight him. He learns lessons easily by listening to the other pupils. A logical and connected story told well by one of the masters will engrave itself for ever on his memory. He learns poetry by heart aloud, but he does not care to read himself, as his own private reading does not seem to be of much use to him. Kodia has good musical aptitudes: he plays the violin fairly well and sings well in chorus. After going to a Russian opera, he was asked if he liked the theatre. «I love the theatre above everything,» was his reply. Kodia' s work in straw-plaiting is not a success. He has great difficulty in grasping the shapes of the various objects. He does not like this work either: it seems to him extremely monotonous and it bores him.»

Another boy, Kocia, whose tactile sense is keen, does not move about much. He likes to stay a long time seated in the same place. He moves about with an uncertain, timorous and unsteady gait. His spine is slightly curved and bends rather forwards. His hands are long and awkward; his fingers are thin and move about like an insect's feelers. When Kocia comes across a fresh object, he seizes it quickly with his long hands and proceeds, with wrapt attention, to examine it. His thin, knotted fingers glide over it and, while occupied in this way, his face changes quickly. His expression is now grave and thoughtful, and then, all at once, it lights up with a bright smile, which shows that the impressions received are intelligible and pleasant. Kocia divides all objects accessible to the touch into two categories: agreeable and disagreeable. With the latter he will have nothing to do, he simply flings them away from him. As to the former, he likes to keep them,

to take possession of them, and when the beloved objects are his own property, he hides them away in his cupboard, locks them up like rare jewels and then, in his free time, he takes them out and duly admires them, feeling their edges carefully with his slender fingers, and this seems to give him strange pleasure. For Kocia, there are also objects that are pretty or ugly. It is also by touch that he decides these two qualities, but he cannot explain the principles which guide him in considering one object pretty and another one ugly. He contemplated, for instance, by the help of touch, the busts of the two writers, Pouchkine and Gorky. On pointing to Pouchkine's bust, he said : « This one is the more beautiful of the two. » He was asked why, but could only reply : « I do not know, but it seems to me more beautiful. »

Kocia's hearing is not keen. In dictation he makes great mistakes. He frequently misses letters and whole syllables. He nearly always distorts the ends of his words. It is chiefly in oral dictations that he makes most mistakes. In copying words and phrases with a book, after reading the text by touch, he makes distinctly fewer mistakes. It is very difficult to give Kocia the representation of no matter what object, by means of the most exact oral descriptions and explanations. Most of the words remain for him an empty sound which leaves no trace in his mind. He cannot explain to himself, or imagine an object, until he has felt it carefully on every side ! No clear idea of it comes to him except by touch. Kocia likes to study real objects. He has a strong aversion to abstract notions. The oral lessons of his master he never learns well. He remembers a reading by touch very well, and when he is telling anything he has learnt in a book, he re-

members exactly the page and even the lines that he read. His recital of this lesson is nothing but the reproduction of the reading by the help of tactile memory. He remembers what he has learnt very well anf for a long time. Complex ideas last a long time with him; his judgments are clear, explicit and logical and his conviction generally firm and stable. It is a very difficult matter either to persuade or dissuade him by words. He is a veritable Didymus, for he only believes when he has touched with his finger. Kocia's character is just as firm and steadfast as his convictions, and his sexual inclinations strongly developed. His actions are selfish and the motive of them nearly always self-interest.

The boy Kipa (who belongs to the motory type) is very active, agile and petulant. He is twelve years old and he lost his eyesight at the age of seven. Jumping, stamping with his feet, clapping his hands, games and shouts, all this seems to be absolutely necessary to him. Generally speaking, movements of all kinds seem to provoke in Kipa agreeable sensations, but they stifle peace. He represents to himself absolutely all objects as moving. The dog, in his imagination, is jumping, the horse galloping, the crow flying and croaking. Tell Kipa to write ten words giving the names of objects of any kind, and you will see that eight out of the ten he writes will indicate animated objects. For him all life is expressed by movements. He personifies, and even pictures to himself, immovable objects as though they were in movement. According to him, stones jump, colours play and laugh, trees fight each other, sigh and weep. Although Kipa has not studied cosmography and knows absolutely nothing about the celestial bodies yet, when he is asked the question :

« Do the sun and moon move? » he replies in the affirmative, without any hesitation : « Yes, they certainly move. »

He always wants to give shape, immediately, to every representation received, to reproduce it in movement by means of drawing, modelling, or by a theatrical representation. After a geography lesson, he will trace, with his finger, on the sand, islands, peninsulas, rivers, lakes, seas. He will model in clay an eagle's beak or a bear's foot. Once after a lesson on Russian history, Kipa represented, in a very natural way, but dramatically, Ivan judging the guilty boyards. Generally, with him, every word is immediately put into deed. Kipa usually learns his lessons aloud, pronouncing every word clearly and correctly. His organs of speech move very easily ; his jaws move when others are talking. He remembers better what he has written himself. Reading to himself is tiring and disagreeable to him. It is also nearly useless, as scarcely anything of it remains in his mind. Kipa is lively and inconstant. He is actuated by impulse for nearly all that he does and has no fixed principles. His imagination is extremely developed. He remakes poetry according to his own mind. One day when I was trying to familiarise my pupils with Pouchkine's poem, *Poltava*, I read the following lines :

« Sur un brancard, pâle, immobile,
« Souffrant de sa blessure, Charles apparut.

Kipa stood up and said : « To me it seems as though Charles moved about, flourished his sword and tried to spring off the stretcher. » The boy is naturally inclined towards what is right. He is always ready

to help his school-fellows and will stand up for the truth with all his strength. (1)

The blind must not meekly allow themselves to be classed in one of these three categories. The three characteristics on which they are respectively founded are to be met with in very varied degrees in every individual, and from their combination come results which are very variable and of infinite number. And then, too, the rôle of the attention is perhaps increased in proportion as the sensorial organisation is more imperfect, attention must then act as its substitute to a greater degree.

Its importance is such that, according to my opinion, there is, perhaps, from an intellectual and moral point of view more difference between one blind man and another than between one man who sees and another. We have seen how many different forms the construction of the outer world presents to the blind, on account of their lack of the unifying power of sight. It is by means of attention that the contents of the consciousness are elaborated and turned to account. For one Helen Keller who tears open, in an instant, the envelope in which she was being stifled, and takes a magnificent flight into the world of intelligence and knowledge, how many deaf-blind persons there are who can scarcely be roused at all!

Attention that passes from the instinctive form to the thoughtful form becomes will. We hear some people affirm that the blind lack this entirely, whilst others assure us that they are exceptionally endowed with it. I believe that both these assertions are

(1). Sliepiètz, No. 4, 1908. I am indebted to a member of the Valentin Haüy Association for this translation. The three types described were not, I believe, observed by the author, but they are given as the result of very strict observations of detail.

true. The obstacles which blindness raises on a man's path through life may, like difficulties of every other kind, either stimulate his ardour or crush it. These obstacles fortify the strong and overwhelm the weak.

Whoever has frequented a school for the blind knows very well that a formula like the following: « The will is more developed in the blind than in those who see, » does not hold good. But when I hear, on the other hand, psychologists affirm that psychical energy is rarefied with the blind, because the chief source from which it is drawn is closed to them, then I think of so many of the blind who have fought, inch by inch, in order to make a place for themselves by the side of those who see. With such the intensity of their will is only equalled by their perseverance. A German psychologist has written that only Helen Keller's will power can, in the nineteenth century, be compared to that of Napoleon.

I would say as much with regard to individual reflection, which is merely will-power attached to the things of thought. The more difficulty the blind man has in knowing the world around him, the more his desire to assimilate himself with it urges him on to substitute reasoning for the sensorial information which he lacks. If the effort required for this should exceed his faculties and surpass his curiosity, it may discourage and enervate him. For thought, as for action, blindness then either serves to stupefy or to stimulate.

2

These considerations, and many others, show us that all the characteristics, all the sentiments and all the tastes of humanity, or at any rate nearly all,

may be found amongst the blind. If only they are given a suitable education, they are then called upon, not to hold themselves aloof from the world, but, on the contrary, to mingle with the social life of those who see, and to adapt themselves to the most varied surroundings.

The blind man is, generally speaking, sociably inclined, as it is not sight, but hearing and speech which, by throwing a bridge across from mind to mind, constitute the real bond between men. He is also sociably inclined, because it is by conquering his place in the midst of other men that he raises himself, in his own eyes, from his physical inferiority. It is by mixing with his fellow-creatures, by trying to live with them, and to struggle with them, that he wrenches himself away from the humiliation of his infirmity, and that he has the sentiment of his own dignity as a man.

There are blind men whose society is very much sought. Intimate and deep friendship unites certain blind men with those who see. Marriage between a woman who sees and a blind man, which would, sometime ago, have seemed a strange and almost monstrous thing, has become a normal, and even an ordinary occurrence. I speak, of course, of marriage, when it is absolutely a free one, not depending on mutual financial interests, but on mutual affection. That it is possible to fall in love, and to fall desperately in love, without seeing is no longer questioned. Violent love, supposed to be peculiar to young men of twenty, but which is peculiar to men of all ages, is equally prevalent in the world of the blind and is so much the more painful there as the obstacles to it are frequently more insurmountable. With regard to the affection which urges a young girl, at the very height of her charms, and sometimes in the midst

of all the hopes which wealth and a good social position give, to devote her life to a blind man, what part of that affection is due, often unconsciously, to compassion and to her unselfishness, I will not attempt to find out. I would only say that, when there is nothing to fortify them, these sentiments constitute a danger, as from their very nature they are fragile, and habit may wear them away. They create the illusion of love, which quickly vanishes, too late, unfortunately. The dangers with which such sentiments threaten him make it the duty of the blind man to put off his decisions for a long time. Devotion and compassion are only lasting, generally, when they are grounded on deep affection and similar tastes and opinions. Fortunately souls find each other in other ways than by glances. I have been told of a woman who killed herself, in the presence of a blind man, because he refused her. Without taking exceptional cases, so many marriages prove to us that there is no gulf, as people imagine, between the mentality of the blind and that of those who see. For anyone who does not know him, the blind man is a strange being whom one does not approach willingly, nor without a kind of dread. When one knows him, he is no longer the blind man, in the sense in which we usually understand this word, with all its accompaniment of indelible blemishes, but merely a man who does not see.

## 3

If, however, the blind man wants to live the common life in society, he must submit to the law of work. There is no place in society for the man who does not participate in the common task. Haüy understood that it was not enough to lift the blind

up to the level of other men by education, but that he must make them capable, if possible, of earning their living by their work.

It is in this that the chief difficulty lies. If the blind man equals the man who sees, from an intellectual and artistic point of view, we have proved that it is not the same thing with regard to the point of view of action.

Unlike his mind, his physical activity seems to us to be restricted in every way, limited by obstacles of all kinds. As a workman, it only gives him access to a very small number of the employments fixed by the division of social work.

Many of the trades which he could take up are, as we have seen for the trade of electrician, impracticable for him on account of the necessity of adapting himself to surroundings which are constantly changing. Those which remain to him are frequently those which require the least skill. Consequently the competition is terrible and wages are low. His habitual slowness reduces his remuneration still more. Then he must, in many circumstances, pay a guide, so that the balancing of his budget is an almost insoluble problem. Experience proves to us that only in very exceptional cases a blind chair-mender, basket or brush-maker, can earn his living entirely by his trade.

But the more that intellectual activity is important in a trade, the more the inferiority of the blind diminishes. As renumeration generally increases in proportion with the knowledge required, the blind man can than meet his special expenses more easily. As much as possible, therefore, the blind should be helped to take up professions which require the exercise of their intellectual and artistic faculties. Their instruction should. therefore,

be increased. The blind man can hold his own with any rival who has his eyesight when it is a question, perhaps, of interpreting one of Beethoven's sonatas, of a legal consultation, or of discussing or voting a law. Unfortunately the division of work is made in such a way that, more often than not, intellectual occupation is completed by activities for which sight is necessary. A professor, besides the instruction he gives, has to maintain discipline. A magistrate has to read certain documents. In many cases, I grant, the second function may be contingent and so may be suppressed, but society is not made for the blind. For instance, even among the liberal professions, there are very few accessible to them. Theoretically, all things otherwise equal, these are the most suitable for the blind.

But if I have said that blindness does not impede the development of the intelligence, I have not said that it creates intelligence. All cannot aspire to those occupations for which eyes are least necessary. People may consider it their bounden duty to cultivate, as much as possible, the faculties that every blind man has received from Nature. It is of no use, though, to think of making artists or writers of them all, Just as with those who see, every degree of human intelligence is represented among the blind and, for every degree, there are very few employments accessible. It is very clear, therefore, that they cannot evolve from the lowest to the highest step of the social ladder with the same agility as those who see. They are doomed to take up just a small number of trades and, in the exercise of these few trades, they will frequently find great difficulties. In theory, however, the problem may be considered as solved. There are many who can maintain their family. Even those who are in the most disadvantageous conditions,

provided, of course, that their health is good, although they may not be able to earn their living entirely, can do a great deal towards it by their work. From a moral point of view, more particularly, this is a result to be appreciated.

During the last hundred years, the blind, who had been more or less restricted to the lowest class of society, where begging and immorality went hand in hand, and where all who were incapable of adapting themselves to social life herded together, have gradually made their way into all classes of society and have proved to the world that their human nature is complete.

## 4

If, in practice, results are so much below not only our wishes, but our legitimate hopes, it is because, added to the obstacles caused by the psychology of the blind, there are others which depend on outside causes.

In the first place, there is the insufficiency of our scholastic organisation. We have seen how complex is the education of the blind. It has, nevertheless, been given over nearly always to chance circumstances and to the caprices of incompetent persons. If, generally speaking, it is well organised in our National Institution of Paris, there is a great deal that is unsatisfactory in very many of our provincial schools.

Then there is the extreme slowness with which the prejudices with regard to blindness give way. Ideas go less quickly than facts and come hobbling along very far behind.

The revolution brought about by Valentin Haüy has not yet penetrated the mentality of the public.

Prejudice, results of which we have seen under so many forms, is too deeply rooted in the brains of those who see, to be uprooted in one hundred and twenty-five years. So many beggars who live on it, and whose sole trade is to look pitiable, have done all they could to keep up this prejudice. A great number of blind workers would make their cause triumphant. At the 1901 census, it was found that there were 27000 blind persons in France, that is one blind person out of every 1,433 inhabitants. Out of this number, two thirds would be old people, the majority of whom had become blind late in life. They, therefore, would not count from the point of view of propaganda in favour of the blind. If we now deduct from the number all those whose health is very poor, and who are classed among the blind, because their blindness is the most evident of their infirmities; those, too, who were not able to receive any education, or only of a very insignificant kind; and those who, living apart in convents or boarding houses, could not influence public opinion much, I feel sure that I am over-estimating the number in reckoning that there are, at present,500 blind persons in France old enough and able, by their example, to serve the cause of their fellow-sufferers efficaciously. Blind workers are, therefore, too rare, and are victims of their small number.

The progress of prophylaxis which, as we have seen, tends to lower the average standard of the intelligence with the blind, prevents this proportion from getting larger. Whilst in 1901, there were seventy blind persons out of 100,000 inhabitants, in 1851 there were 105, that is 50 % more, and the census of 1851 was probably less thorough than that of 1901. From one census to another, we see the proportion decrease as hygiene makes progress, as

oculist specialists are trained and as ophthalmological cliniques are founded in the great centres. Since 1901, there has certainly been much greater progress still, particularly as regards the fight against ophthalmia in new-born babies (1). Such progress is, most certainly, the only really efficacious remedy for the ills that we are fighting against, and there are no more ardent apostles as propagandists than the various groups of the blind themselves. All this is hard, though, for the incurables, as it takes away from them champions of their cause, and the best armed champions, those whose general health is good, and whose eyes alone are affected, as it is just these whom the oculists cure.

However we may fight against them though, the prejudice against blindness and the insufficiency of our special education are contingent vices. We have every right to hope that time will eventually triumph over them. The relief for the blind will then be inestimable. I think, though, that it will always be in the difficulties of adaptation to social surroundings that the great suffering of blindness will consist.

5

The suffering occasioned by blindness is not inherent in the heart of the blind. They are not necessarily haunted and tortured, as is supposed, by the wish to see the light.

The soul of a blind man is just as accessible to joy as that of the man who sees. It is a mistake to imagine him as always oppressed and weighed down by gloomy thoughts. How should he have that thirst

(1). On this subject, I would refer my readers to an article of mine in the *Revue Bleue* of May 27 1911 : *Nouveaux efforts contre la cécité*

for something that he has never known? Associating with those who see will teach him how useful sight is, but nothing could make him feel how sweet it is, nor give him an idea of it. There are very few suicides among blind people. The Russian novelist, Korolenko, gave to his blind musician longings for light and colour that were innate and intensely painful. He even built up on these the whole psychology of his hero. This was a writer's fancy though, and had no foundation on reality. When such longings come, they are not the fruit of instinct, but of refined thought and meditation, and they are not accompanied by those pangs of anguish which are supplied, almost unconsciously, by the imagination of those who see. « I regret sight, » said a blind man, « just as one may envy the gift of divination, or the wings of the eagle. »

A blind woman told us of the clever stratagems with which her parents surrounded her childhood, in order to hide her infirmity from her as long as possible. They succeeded so well that when she showed her dolls to other people, the little girl was indignant that they did not touch them. All this was lost labour. The truth would not have made this child suffer. By surrounding the truth with mystery, by making her childish curiosity on the subject work more and more every day, they gave her a gravity which she would never have had. Parents do not risk anything in talking to their child of the treasure which it lacks, as it will never understand the value of it. And the longer the revelation is put off, the more painful it may be to a person born blind.

With those who become blind later on, it is naturally very different. They know what they have lost and sometimes suffer bitterly. But, as a rule, as the

memory of sight gets less keen, the regret is also less keen. The remembrance of sight is, of course, never obliterated. After the inevitable crisis, one goes back to everyday life and, if only one has a satisfactory occupation, one only feels, intermittently, the wound which gradually heals up. I know of many blind persons, and of all ages, who, like Augustin Thierry, have « made friends with the darkness. » This is usually the case for all those whose active life had not commenced before their blindness came upon them, and for whom a whole world of hopes had not been completely wrecked by the catastrophe.

It is a great mistake to imagine that a heavy cloud of gloom hangs over our special schools. The children there play games and are gay, turbulent and mischievous, just as in the schools of children who see. I studied at schools of both kinds, and it would be difficult for me to say in which our masters obtained from their pupils the best results. In our Institutions for the Blind, there is nothing to remind everyone of an infirmity which each one shares. It is not felt, because it does not create an inferiority for anyone. A society of blind people would not trouble at all about sight. Wells assures us that such a society would treat those who claimed to be endowed with it as we treat the so-called interpreters of the archangel Gabriel.

When once the threshold of the ordinary school is crossed, the bitterness and the tribulations commence. « I suffer, » said a blind person, « because, having only four senses, I live among those who have five ». The privation of one sense was not the trouble, but the inferiority felt among the others. Such a person has great difficulty in making his place in a society made by those who see. If the man who sees

fails in an enterprise, he always has his eyes and his arms for taking up another one. The blind man, who has had great difficulty in acquiring a certain line of activity, is compelled to succeed in it. On the social chess-board, there is only one square for him. He must win where he is, or he will have the moral torture of feeling that he is a burden for his family. Much more than this difficulty, there is that of his dependence, a dependence of every minute, which weighs on him heavily. Besides the ordinary services which men in society owe to each other, the blind man needs a great many others. Even to accomplish his task, he needs help. A secretary reads him his letters from clients. He must have someone to accompany him when he goes to his lessons, someone to read him a piece of music which does not exist in Braille. For whatever he wants to do, he must have someone ready to accompany him, and if this person should arrive late, the consequences may be serious to him. He has to count on those around him, constantly, for little favours and for little kindnesses. He feels as though he is chained to others. Above everything he is the plaything of prejudice. With those who should employ him, he feels a certain distrust and incredulity about his talents. If only they knew what he is and what he can do ! There is no chance of that, as people have a foregone opinion. No matter what he can do, he is blind. « When we have convinced them on one point, we soon see that their distrust begins again on another point, » writes one of these discouraged workers. It means always beginning over and over again.

These obstacles, which the blind man finds confronting him at every step, which prevent him from turning to account his knowledge and his talent,

are for strong-willed natures the keenest form of suffering caused by blindness. This is quite another thing from the wearing discouragement, or the revolt, which the doctor without patients, and the lawyer without briefs must feel, when waiting in vain for clients. All the blind man's various disappointments are felt as degradations. They gradually cause the heart-rending sentiment that blindness is a disgraceful infirmity to sink deeper and deeper into the mind. Blindness then seems worse than any other infirmity, as it makes its victim incapable of performing his duties as a man, incapable of aspiring to the joys of a man, to the consolations of a home of his own; and yet he certainly has more need of all this than any other.

In a nature in which there is more sensibility than will-power, humiliation will be the chief cause of the moral distress. It will be felt not on account of the disappointments with regard to professional activity, but on account of the social intercourse of everyday life. The little services for which he must count on one person or another are not only a slight handicap to the blind man, they work him up to a state of worry which becomes torture, the worry of being a nuisance to those around him. He thinks of all the debts of gratitude he owes, debts that are sometimes very sweet but, according to the person to whom he is indebted, sometimes very heavy ones. His freedom of action and of speech seems to be fettered. The necessity of having a guide, besides being very tiresome, is also embarrassing. A stranger must read his letters, is present nearly always, and even if he should not be guilty of any indiscretion, such as a susceptible imagination is apt to magnify, the very presence of this person is distasteful. A very thin skin is also very easily

wounded by words and gestures which seem to prove to a blind man that he is confounded with an impotent, or a feeble-minded person. I do not at all mean to say that people should, as they often think, avoid all allusion to a man's blindness. They can quite well speak to him of it, but it should be quite naturally, and with an exact idea of the incapacities that accompany it. What shocks a blind man is exaggerated pity or a great show of admiration, which is just as painful, as it is the result of the same insulting ignorance. Neither does he like perpetual offers of service, such as moving a chair or putting a book in its place for him. On the door of one Institution for the Blind are the words : « Visitors are requested not to utter any expressions of pity. » The Director of that school is certainly a psychologist. As an effect of reaction against all these well-meaning exaggerations, the blind man sometimes develops an oversensitiveness which becomes morbid. He exaggerates the prejudice against his infirmity in just the contrary sense. For, we must own that there is a prejudice in the contrary sense. The whole ambition of the blind man, all the inner aspirations of his sensibility, are to equal the man who sees, or at least to come as nearly as possible to such a result, to make people forget his physical defect. Between this and forgetting sometimes the boundaries of the possible and the impossible, losing sight of his own real incapacities and wanting to go beyond his powers, there is frequently only a step. Between two such opposite ways of looking at things, the one tending to consider blindness as an accident of no importance, and the other treating it as the greatest of all the misfortunes which threaten human life, there must, of course, be constant clashes. Hence comes that timidity so frequent with the blind

man. It is merely the result of his self-respect being wounded and over excited. If he should happen to knock against anything before strangers, to fail to recognise someone's voice, or to commit any little awkwardness, he at once exaggerates it in his own mind, feeling that those present will very wrongly consider it as a confirmation of their theory. Even trifling accidents, inevitable to everyone, such as breaking a glass, spilling a few drops of water, to which no one attaches any importance, are sometimes quite painful to the blind man, just as though it were less admissible for him to have such accidents than for others. This preoccupation about people's opinion, exasperated by the knowledge of the general prejudice, sometimes causes a blind man anguish. The dread of any humiliation then paralyses his movements, and it seems as though the glances fixed on him materialise and weigh on his face and on his limbs.

As a compensation for all this, he meets also with natures belonging to the élite, whose very presence, as though by some magic virtue, soothes these troubles caused by timidity, natures with whom the blind man feels on equal ground, because they are on equal ground with him. A mysterious intuition reveals to them what blindness is. They know, without being told, that in order to oblige a blind man, they must not always act for him, but, without any affectation, help him to take as large a share as he can himself in the common action, so that he may have the satisfaction of doing things with others and like others and even, in his turn, for others. Their attention, although vigilant, does not weigh on him, so natural is it and so discreet. They guess instinctively what is difficult for the blind man and they do it for him without talking about it, and almost

without thinking about it. They understand that when guiding him, they do not need to warn him about the various things on the way, but to make him guess them by their movements. They give him all the assistance necessary, but only the assistance necessary. They talk to him about everything, even about blindness, without the slightest embarrassment. They have that marvellous art of divination, which is called tact, a mysterious mixture made of the keenest intelligence and the most delicate kindness. Oh, the exquisite flowers of human goodness, the perfume of which the blind man is sometimes permitted to enjoy!

These flowers have a sovereign power of healing his wounds. It has been said that the blind man is a pessimist from the age of fifteen to thirty. This is too summary a judgment. There are many, for instance, who pass through life without thinking much about it. There are those who exploit the general prejudice about the blind, instead of letting it trouble them. It is, however, true that very often the blind man who meets with great difficulties in his trade, and also the one who succeeds in his enterprises, but is endowed with acute sensibility, frequently, towards their adolescence, fall into a sort of pessimism which lasts a more or less long time and which is also variable as regards its intensity. After this, the blind man grows accustomed to his fate; he hardens his nerves, and his balance of mind returns.

I read recently a short story, in which the hero, the blind son of rich parents, is presented to us just as he leaves school. His childhood, with his blind-school-fellows, had been brightened by happiness and lack of all care. The first winter of his freedom was still gay and lively, as the animation of a large

city prevented him from falling back on himself. The theatre, concerts, music-halls, parties, balls, and distractions of all kinds enlarged his limited horizon and aroused, at the same time, all the sensations possible in the young collegian's soul. It was a most delightful excitement for him. His sister's friends visited the house and his brothers' friends brought him books and talked, in his presence, of women, of philosophy and art. But very soon he began to feel like a stranger in the midst of this life. They all treated him as disabled. He did not notice this at first. The girls were more familiar with him than they would have been with other young men of his age. They brought him flowers as this did not matter, because he was blind. His mother's friends whispered to each other when they looked at him. When, in reply to their entreaties, he played either a waltz or a funeral march, there would be tears in their voices when they thanked him. Everyone around him worked and he alone did nothing. He felt stifled after some time in this artificial kind of life, and he decided at last to leave home and live the true life, the life of work. No one around him understood. They wondered what he lacked at home, or whether he was going mad. His mother was in despair; his sister was sure that he must be in love with one of her friends, and reproached herself for not having anticipated anything so unreasonable. His father simply shrugged his shoulders. « Let him give a few lessons if he likes, » he said, « he need not leave home for that. » « Let him try, » said his brothers, laughing. « He won't go on long and he'll appreciate home better afterwards. »

He left home, almost in disgrace, and went to live with a school-fellow, a blind piano-tuner, who worked

from morning to night. The unwise solicitude of his parents followed him there and, in order to make him repent more quickly, they persuaded his landlady to make life impossible for him, by preventing him from having customers and by paying his guide not to keep his engagements. They paid cash down for the unhappiness of their son. They did not understand that the only remedy was to make his task easy and that work, especially when a kind hand pushes aside hardships that are too rough, offers to the blind man the safest refuge, as it lessens his dependence and helps him to silence the prejudice.

## 6

Coming into contact with those who see does not only reserve fresh suffering for the blind man; it may also corrupt him.

Surrounded by blind men like himself, he is not distinguished from the other men by any special moral discouragement. Those who accuse him of being too susceptible are mistaken by their own logical deductions; whilst those who are surprised to find him of an agreeable, lively disposition are dupes of the same illusion. They exaggerate in their own minds these qualities in him, because they had expected to find exactly the opposite faults.

But in the society of those who see, blindness is a cause of inequality. Now all causes of absolute inequalities among men engender vices. Because of his inferiorities, the blind man is often inclined to neglect certain duties and to claim for himself special rights. Instinctively, he considers that others are bound to render him services, and that he himself is freed from obligations to others. These

are compensations due to him and the more that the prejudice, with regard to the blind, magnifies his inferiorities, the more he is apt to consider these compensations increased. Theoretically, when confined within reasonable limits, this principle holds good. It may, in practice, lead to great abuses. It is a dangerous ferment for the selfishness latent within each one of us. This tendency to take advantage of another is frequently encouraged in the blind by the lack of wisdom of those around them. Many parents, by spoiling their blind child, under the pretext of helping him to forget his infirmity, by doing everything for him, because they think he is incapable of doing things for himself, accustom him to expect everything from others, and even to demand everything as a right. The consequence is he develops an insociable character.

If a vigorous education does not correct all this, such parents are likely to be the first victims of their own mistake, as ingratitude is the inevitable consequence of egoism. For services that are due, no gratitude is considered necessary. Such children will suffer still more from their lack of early training. First, and above all, because their own character will deprive them of the sympathy and affection of those around them, and then, as they will always ask from others more than they can obtain, they will be exposed to perpetual disappointments.

The effect of egoism is to cause us to judge ourselves wrongly. Vanity, or ought we to call it pride, is a very frequent failing with the blind. Everything helps to develop it in their social relations. Imagine a blind child of ten or twelve years of age in his own school. He will learn to read, write, count, mend chairs and play the piano a little. Among his school-fellows who have learnt the same

things, he knows that there is nothing remarkable in all this. As long as he only talks to his school-fellows, there is no special danger of him becoming conceited. But visitors come to see the school. They talk to the little pupil, ask him questions and are amazed that a blind child should arrive at such results! When once the visitors have gone, it is very likely that the little prodigy will laugh with his school-fellows at their silliness, but the poison has nevertheless penetrated into his mind. And this little scene is enacted over and over again, once a week perhaps. Then come the holidays. The place changes, but the same thing happens. The little blind child goes home. The parents invite their friends to come and see the progress he has made. They are all amazed. When he had been sent away to school, these friends had all thought it useless and a great mistake to let him go so far away, as it would only cause him more suffering. He was blind and he could not learn anything. And now here he was, as clever as a school-master! Surprise and admiration make everyone eloquent. The little prodigy begins to take himself seriously. This is all the more easy, as his school-fellows are not there to chaff him. Temptations may even have commenced when he was younger still. In his own family, each time that he had acquired some little talent, perhaps to tie his shoe-laces or to fold his dinner-napkin, his parents hailed this as a miracle. A child must have a strong head to resist so much incense.

I must own that I have met with many blind persons who were quite objectionable, thanks to their childish vanity, and these same individuals were often accused of ingratitude and egoism. In most cases I had a distinct feeling that they had been spoiled

by their surroundings, and that if they had been placed in different circumstances, they would not have contracted this moral deviation. Blindness had been the incidental rather than the direct cause of it. This vanity then is not at all a necessary consequence of blindness. A little of the inner life suffices for setting things right and sweeping away all danger and, as everyone knows, this inner life is not lacking with the blind. Many among them are remarkable for their great delicacy of sentiment and have not even been touched by those defects or vices that are sometimes called the vices of the blind. Do not, however, let us go to the other extreme, with some of those optimists, whom M. Heller very rightly reproaches, who accord moral superiority to the blind. We must not imagine that they are endowed with the privilege of always judging and acting with common sense. Although, like the vices of which we have spoken, qualities of deliberation and of judgment are by no means natural consequences of blindness, yet they are sometimes increased thanks to blindness. They do, certainly, keep in check the invasion of wrong sentiments. It is thanks to these qualities that a large number of élite are protected.

For the masses, other means of preservation must be sought. Moral teaching in our special schools ought at least to have a chapter more than in the schools of those who see. It is important, when teaching blind children, to insist on the incapacities of blindness. As far as I know, this is never inisted on. They should be told of the limits imposed on their activity by blindness, and of the duties that it necessitates towards others, on account of the dependence that it creates. People fear to crush their energy by teaching them to think of

these questions. By not teaching them, we allow a free course in their minds to a sort of unreality, which is very prejudicial to others as well as to themselves. Oral instruction is only a very fragile dyke. The most efficient remedy again here is, perhaps, work. By sharing in the common task, the blind man has to struggle with competitors. By comparing himself with others, he learns to know his true value and touches with his finger his real inferiorities. He also learns to esteem at its right value the help that he needs from others. Competition is not lavish in its flatteries. It is a school of realism. The man who is not incurable will be cured by it.

## 7

The blind man feels the necessity for work for the sake of his morality and happiness, as well as for his dignity. One example will serve to show us that by work, with certain conditions, the adaptation to social surroundings takes place satisfactorily This example is supplied by our National Institution for the Young Blind, Valentin Haüy's school.

Valentin Haüy's idea was to make manual workmen of the blind. He taught them to cane and mend chairs, to make baskets, rope, list slippers, etc. In his school, general notions which everyone must have were, no doubt, given. A little music was also taught, but the chief effort was for manual trades. I have already given the reasons why the blind workman, generally speaking, cannot earn his living. Obstacles increased still more for him during the nineteenth century, on account of the progress in machinery. At present, the workman who cannot handle a machine, who has no place in the

factory, must usually content himself with a very small salary. Therefore, half a century later, a radical change had taken place. Music, which had at first only been taught by way of a diversion, now took the first place and muscial instruction developed more and more, to the detriment of the manual trades. These now fell exclusively to the lot of pupils refractory to all musical culture. It had been found that positions as organist or music teacher were much more lucrative. The alphabet with dots in relief, invented just at this time by a pupil of the Institution, Louis Braille, was instrumental in the rapid and successful development of this musical education. As intellectual education was equally facilitated by this new system, young musicians were able now to obtain for themselves, much more easily, the degree of culture which their new situation demanded.

Soon after this, another pupil of the school, Montal, in spite of the injunctions of his masters, managed to take a piano to pieces. He proved that the blind could tune pianos perfectly well and, in a very short time, he was teaching pianoforte tuning to his former school-fellows.

In this way, urged on by necessity, blind pupils of the National Institution opened out for themselves two new roads towards the light. They acquired for themselves two branches of fresh action, two branches relatively easy for their physical activity, and which included a capital of talents and knowledge. A third branch was, presently, added to these two: the more enterprising of the tuners, as soon as they had a little money, were tempted to start a piano-shop, thus adding to the money obtained by tuning the profits of a small trade in music and musical instruments. In this way, by leaving certain prac-

tical details in the hands of a trustworthy person, they could employ their intellectual faculties, which their blindness had not affected in the least.

For those who had no muscial or commercial aptitudes, there was now still another employment for these intellectual faculties. Ever since the opening of schools for the blind, it had been customary to choose the future teachers from among the best pupils, not only for music, but also for intellectual instruction Towards the middle of the century, there were many more of these envied posts, thanks to the creation of many special schools for the blind.

Most of the pupils belonged to the poorer classes, as it is is here that the more usual causes of blindness are generally to be found, such causes as accidents, lack of hygiene and delay in obtaining a specialist's advice. It was felt that, in order that they might enjoy a fuller life, all those capable of a higher education should be raised, by means of this, to a higher social class. Finally a Society of Patronage was founded in connection with the Institution. The mission of the members of this Society is to keep in touch with pupils as they leave, to help them when necessary, and to help them to make friends in the various places to which their work in life calls them. All this was an attempt to remedy the three defects which we pointed out a little while ago. In the first place, professional instruction was given adapted to the requirements of the blind; an attempt was made to second them in their special difficulties and then, in their immediate neighbourhood, the prejudice with regard to the blind was fought against for them.

The results of this vigorous effort were very marked, and thanks to it the pupils of the National Institution owe their relative prosperity. In 1905, the Patron-

age Society was in touch with 264 former pupils, and we are now only speaking of men (1). Among these, 64, on leaving school, returned to their respective families.

These were the least courageous, as most of them had not the necessary energy for trying the risk of an independent life. About thirty were either ill or incapable. The others contribute by their work to the general expenses of their home, but out of this number only seven or eight earn their living entirely. A second group is formed by 94 unmarried men who live independently. What they earn is, as a rule, only just enough for paying bare expenses. Some of them, only a small number, are obliged to ask for a little help occasionally, but, on the other hand, a few of them are fairly well off. Then 120 of them, that is over forty per cent, have been able to take the responsibility of founding a family. They now enjoy home life and the satisfaction of leading a normal existence. Sixteen of this number have not been able to make ends meet, either because they married too soon, or because they have too many children. Eighteen others call on the Society for help from time to time. Seventy-two of them are quite independent and about thirty of them have made good positions for themselves. Eighty-five per cent of them in all have succeeded in their respective callings. All of them, or very nearly all,

(1). See M. Mahaut's *Report of the Society for finding employment and helping pupils of the National Institution for the Young Blind* (1905).

As regards blind women see Mlle. Boulay's Report for the same Society (1909). It will be seen that the Society was then in touch with 134 former pupils. Deducting from this number 26 who were either ill or incapable of working, 10 pensioners and 2 who had not yet obtained posts, 96 blind women remain who were all earning their living. 75 of these were in boarding-schools and 21 were giving private lessons.

had to be helped at first, and their circumstances gradually improved.

Last year an interesting inquiry took place among all the former pupils of the National Institution, scattered as they now are through France. There was an attempt made to find out how they now accept their blindness. They were asked to compare themselves with the various members of their family who have their eyesight, and to give their opinion with regard to their own situation.

The replies received confirmed, unanimously, what we said just now : not one among them suffered at not seeing the light and the beauties of Nature. They nearly all complained of the inconveniences of blindness, but not of the blindness itself.

A second conclusion could be drawn from their letters. This was that, as a rule, they seemed satisfied with their lot. I know, of course, that their satisfaction was based on an illusion of which most of them were dupes. That is that they congratulated themselves on the intellectual and artistic culture they had received, and on the enjoyment they had obtained from this, and they pitied their fathers and brothers for not having had the same advantages. They congratulated themselves on the fact that, thanks to their blindness, they had been able to mount several steps of the social ladder. It does not occur to them that the delights of intellectual and artistic work are within reach of their fathers and brothers who have, nevertheless, had no experience of these delights and that, on the other hand, their fathers and brothers have other pleasures of which they themselves have no idea whatever. All comparison is, therefore, impossible for them between what they are and what they might have been. It is none the less very characteristic of their state of

mind to think that a balance is established for them between their loss and the profit that is the result of this loss.

The real point of comparison should be sought for not with their relatives, but with their competitors. The education which separates them from their family is, as it were, an accident. It was not actually necessary to be blind in order to have such an education, and it did not actually follow that being blind they were consequently sure to have it. From their competitors, though, it is eyesight alone which distinguishes them. It is, then, when they are confronted with these competitors that they can judge what their blindness means. With regard to this, their complaints are certainly more bitter. The blind man's self respect is wounded, and he is greatly disappointed in his anticipations, when he feels that his rivals have been able to go ahead, simply because they have the advantage over him of their eyes. But when one's work suffices, and is satisfactory, one very soon forgets the servitude of the guide and the injustices of public opinion, or rather one's suffering is greatly blunted, thanks to the sentiment that one is rehabilitated by one's activity. In the little world of the blind, work is often quite satisfactory.

« My situation, » writes a beginner, « has improved in the most incredible way during the last year. I go out early in the day and do not return until nine or ten in the evening. I lunch quickly, wherever I happen to be. I give lessons thirty-five hours a week and have fourteen hours at St. Jean's Church, that makes about fifty hours a week. I have neither Sundays nor fête-days free. In the little spare time I have, I tune pianos, on an average six a week. I always play the organ at Notre-Dame. I play at

parties; I also sell and mend pianos. In short, I do not waste a minute. From all this, it is very evident that blindness has opened for me a much more profitable way of earning my living than I could have expected in my station of life. »

Another blind man writes as follows :

« I had to begin my career with debts. At present, with the exception of my current commercial bills, I do not owe anything to anyone. I have furniture to the value of £400, 15 pianos, forty pounds' worth of musical instruments, and commercial credit to the amount of eighty pounds. In 1911, I did business to the amount of £420 of which £240 for work and the rest for sales and hiring. This means £300 of profit. My brother and my sister envy me. »

Among those who have arrived at such results, their adaptation to their social surroundings only presents difficulties at rare intervals. Those around them gradually learn to consider them as normal individuals, and this is the essential remedy for the various sufferings and defects of the blind. Only the inevitable obstacles subsist and the blind learn to make the best they can of these. From day to day, as organisation gradually improves, these too will be greatly attenuated. Such expressions as « my lucky accident, » or « my providential catastrophe,» are sometimes used, not perhaps by men of the most refined natures, but by simple-minded men, showing us the wonderful cure which an appropriate education can effect in the soul of a blind man, and how rich this education may prove to be in inner satisfactions and in material results, when it is accompanied by an intelligent patronage..

8

Such encouraging success indicates very clearly the line to be followed. The adaptation of the blind to their social surroundings is not always brought about in the same way. Very often the methods of the Paris system have been cleverly copied, but, in several countries, a very original turn has been given to Haüy's work. We have already seen Germany, with its spirit of minute method, at work in the elaboration of a rational education of the senses, whilst England and America attach great importance to physical development, and France concentrates its chief effort on artistic culture. As in education, the variety of national characteristics is to be found in the various places made for the blind among those who see.

Germany seems to have kept to Haüy's conception, but to have exploited this methodically and to have obtained an unhoped for result from it. The ideal of the directors of these schools there, seems to be to make workmen of all the blind, to place them like so many regiments, Prussian fashion, in workshop refuges and, by boarding them and arranging an artificial increase of salaries, shelter them from the difficulties of life. Individual initiative is more or less stifled in Germany, whilst England and America endeavour to stimulate it.

American directors blame Germans for forming blind men who are contented with their sad lot, rather than inciting them to improve it. The American idea is to develop in each man his natural qualities, in order to place each one in the best conditions possible for the great chances of life.

These various methods have their merits and their

faults. The one reckons, perhaps, too little on the individual and the other one too much. In France, our idea is to help the blind, but that the bonds which unite us should be extremely supple, so that we may tighten or loosen them in such a way as to give the maximum of liberty and the maximum of safety. Foreign methods, though, provided all excess be avoided, may help us to improve our own. As a matter of fact, none of these methods should be excluded, as they all complete each other. The German workshop, or a similar organisation, such for instance as the one installed about twenty years ago at the St. Mandé Braille School is, perhaps, necessary for the more awkward of the blind. Anglo-Saxon boldness is suitable for the more valiant ones, whilst it is certainly by what we call the French method that the greater number will be helped to realise, more or less completely, the dream of independence which all of them have at heart.

The real progress will come from the best adaptation of these various conceptions, the results of experience, to individual needs. I have already mentioned how, in my opinion, the adaptation of the blind to their social surroundings should be carried out. The two essential tasks, which are most necessary first, are the reorganisation of our special teaching for the blind and the improvement of our system of patronage. The State alone can give us this reorganisation, the principles of which I have endeavoured to point out. The patronage is carried out chiefly by a magnificent organisation, the creation of a blind man, M. Maurice de la Sizeranne: *The Valentin Haüy Association for the Welfare of the Blind.* It has already given admirable results by developing the instruction, by aiding individual needs, by fighting against public opinion, and espe-

cially by organising the special little World of the Blind in such a way that it may meet the difficulties of its material and moral needs, by means of libraries, the construction of special inventions of all kinds, publications in relief, the grouping of the blind, etc.

With similar organisations for seconding it, it would be able to carry out its huge programme. It would be able to aid, still more efficaciously than in the past, piano-tuners and musicians at any special crisis, workmen by the creation of workshops, which in France are less numerous and not as well organised as those in England or Germany. It would also endeavour to find fresh openings for the activity of the blind and would help those which exist to succeed. Among these openings are mattress-making and rope-making, language teaching and above all massage.

As this Association has inherited the ideas of Valentin Haüy and of Louis Braille, it will not forget that, for the blind, the only help that is effectual is help by means of work, because remunerative work alone ensures adaptation to one's social surroundings. The aim and object of all efforts, both as regards patronage and reorganised teaching, should be to help the greatest number possible of blind persons to be self-sufficing, thanks to their own work.

# CONTENTS

## FIRST PART

## THE INTELLIGENCE

### Chapter I

#### THE INTELLECTUAL FACULTIES

1. The Intelligence of the Blind and general opinion . . . . . 13
2. Notions inaccessible to the blind . . . . 17
3. The acquisition of ideas . . . . . 19
4. The teachings of experience . . . . . 26
5. Intellectual particularities . . . . . 30

### Chapter II

#### INTELLECTUAL CULTURE AND THE BRAILLE ALPHABET

1. The psychology of tactile reading . . . 37
2. The advantages of the Braille Alphabet . . 43
3. The conquests and applications of the Braille Alphabet . . . . . 48
4. The possibilities and utilisation of the Braille Alphabet and the Library for the Blind . . . . . 51

## Chapter III

### INTELLECTUAL WORK: AN EXPERIENCE

1. Work requiring erudition is accessible to the blind. Preparation . . . . . 58
2. Execution . . . . . 61

## SECOND PART

## THE SUBSTITUTION OF SENSES AND THE ACTIVITY OF THE BLIND

## Chapter IV

### THE SUBSTITUTION OF SENSES. ITS NATURE AND ITS MECHANISM.

1. Substitution and legend . . . . . 71
2. Influence of the loss of one sense on the other senses . . . . . 77
3. Substitution is of a purely psychological order . . . . . 82
4. The rôle of attention in the development of touch . . . . . 86
5. The rôle of associations . . . . . 91
6. The rôle of sensorial memory . . . . 94
7. Conclusion . . . . . 97

## Chapter V

### THE SENSE OF OBSTACLES

1. This is not a question of a sixth sense . . 101
2. Obstacle sensations are chiefly due to auditive impressions . . . . . 103

3. Their localisation . . . . . 110

## Chapter VI

### THE FACULTY OF ORIENTATION

1. Facts and explanations . . . . . 119
2. Rôle of the sense of obstacles . . . . . 121
3. Rôle of hearing, of smell and of touch . . 123
4. Rôle of muscular memory . . . . . 126
5. Difficulties . . . . . 129

## Chapter VII

### GYMNASTICS AND GAMES

1. The utility of gymnastics for the blind . . 133
2. Out-door exercise and athletic games . . 137
3. The importance of the years of childhood . 144

## Chapter VIII

### INDICATIONS CONCERNING THE PHYSICAL ACTIVITY OF THE BLIND

1. Plan for the methodical study of the substitution of the senses . . . . . 149
2. The material of everyday life . . . . . 151
3. Action in the house . . . . . 158
4. The blind man travelling . . . . . 164
5. Examples of exceptional forms of activity: a blind electrician . . . . . 168
6. A blind cabinet-maker and pianoforte manufacturer . . . . . 172
7. Conclusion . . . . . 179

## THIRD PART

## SUBSTITUTION OF IMAGES AND THE FURNITURE OF THE MIND

### Chapter IX

#### SPATIAL IMAGES THE OUTCOME OF TOUCH

1. The opinion of Diderot concerning the spatial images of the blind . . . . . 179
2. The data of experience: comparison of the tactile sensation and the tactile image . . . . . 183
3. Transformation of analytical sensation into synthetical image . . . . . 187

### Chapter X

#### TACTILE SPACE AND VISUAL SPACE

1. General opinion establishes no distinction between tactile space and visual space . 191
2. Time the blind man's substitute for the space of those who see: Plattner's observation . . . . . 197
3. M. Dunan's theory, which grants to the blind a different space from that of those who see . . . . . 200
4. Conclusion . . . . . 206

### Chapter XI

#### THE VALUE OF SPATIAL IMAGES WHICH ARE THE OUTCOME OF TOUCH

1. In what measure they can take the place of visual images . . . . . 209

2. The properties which make them suitable for this rôle . . . . . 213
3. Their utility for the exercise of thought . 217
4. Their utility for action. More often than not, in practice, a group of images are reawakened in the mind and replace tactile sensation which is too slow in construction . . . . . 219
5. The imagination of concrete space and its rôle . . . . . 222

## Chapter XII

### THE CONQUEST OF SPATIAL REPRESENTATIONS

1. Difficulties of this conquest . . . . . 227
2. The hand as the organ of touch . . . . 231
3. Analysis of feeling things with the hand . 232
4. The psychology of touch in the limits of manual space . . . . . 237
5. The psychology of touch and the feeling of objects of large dimensions . . . . . 241
6. Determination of the positions of objects at a distance . . . . . 246
7. The important rôle of audition . . . . 250
8. Touch and sight . . . . . 254
9. The education of touch and of hearing . . 257

# FOURTH PART

# INDICATIONS WITH REGARD TO THE AFFECTIVE LIFE

## Chapter XIII

### PERSONS AND THINGS

1. The affective qualities of visual sensations

and images: their substitutes in the consciousness of the blind . . . . . 263
2. Sensations and images which individualise: the voice, the pressure of the hand, perfumes. . . . . 265
3. Affective value of these impressions . . . 269
4. Synthesis of these impressions . . . . 275
5. Things: the house . . . . . 276

## Chapter XIV

### NATURE AND TRAVELLING

1. Sensations and images . . . . . 281
2. Their affective value . . . . . 286
3. Objective beauty in Nature . . . . . 293
4. Travelling . . . . . 294

## Chapter XV

### ART

1. Music . . . . . 301
2. Touch and æsthetic sentiment. . . . . 306
3. The substitution of touch in the arts of sight and its limits . . . . . 312
4. Sculpture . . . . . 319
5. Architecture . . . . . 325
6. Superiority of the blind who have visual recollections . . . . . 328

## Chapter XVI

### POETRY

1. The problem. Imagination and the blind. 331

2. The music of poetry and blind poets . . . 333
3. Substitution of spatial, tactile and muscular images for the visual elements . . 337
4. Substitution by equivalents . . . . . 342
5. Substitution by associations of sentiments 345
6. Results . . . . . 350
7. . . . . 354

## FIFTH PART

## PSYCHOLOGY OF THE BLIND IN SOCIETY

### Chapter XVII

### CONDITIONS OF ADAPTATION TO SOCIAL SURROUNDINGS. THE GREAT SUFFERING CAUSED BY BLINDNESS

1. The blind do not constitute a class. (Conclusion of the four preceding Parts.) . . 357
2. The sociability of the blind . . . . . 366
3. Obstacles due to the inferiority of the blind in physical activity . . . . . 368
4. Other obstacles . . . . . 371
5. The great suffering of blindness consists in these difficulties of adaptation . . . . 373
6. The moral dangers which these difficulties involve . . . . . 382
7. A conclusive experience : results obtained by the National Blind Institution of Paris. 386
8. The work of the immediate future . . . 393

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